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6

AN
INTRODUCTORY DISCOURSE,
DELIVERED BEFORE
THE LITERARY
AND
PHILOSOPHICAL SOCIETY
OF NEW-YORK,
ON THE
FOURTH OF MAY, 1814,
BY
DE WITT CLINTON, LL. D.

PRESIDENT OF THE LITERARY AND PHILOSOPHICAL SOCIETY OF NEW-YORK, &c.



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INTRODUCTORY DISCOURSE, &c.

In compliance with the solemnity expected on this occasion, I rise to address this respectable audience. For the first time has an association been established and incorporated in this state, devoted to literature and philosophy. Although I have always ardently cherished the love of letters, yet I am fully sensible that neither my attainments nor my talents entitle me to this place. On my zeal and my industry, however, the fullest reliance may be placed; for although not a minister officiating at the holy altar of science, yet you shall always find me a sincere and humble worshipper at the vestibule of the temple. It is with societies as it is with individuals; if the first impression be favourable, it gives a tone to character which is attended with the most auspicious effects in every future stage of existence: as somewhat of the colour of our social character may depend on this first appearance on the theatre of public observation, you may judge of my embarrassment on this occasion.

The solemn considerations which grow out of an establishment of this nature must press upon our sensibility, with redoubled force, when we reflect upon the accusations which are brought against our country by the literati of Europe. The celebrated Buffon has declared that, in America, animated nature is weaker, less active, and more circumscribed in the variety of its productions, than in the old world; that there is some combination of elements and other physical causes; something that opposes its amplification; that there are obstacles to the developement, and perhaps to the formation of large germs; and that even those which, from the kindly influences of another climate, have acquired their complete form and expansion shrink and diminish under a niggardly air and in an unprolific land! Dr. Robertson has also said, that "the principle of life seems to have been less active and vigorous here than in the ancient continent;" and that "nature was not only less prolific in the new world, but she appears likewise to have been less vigorous in her productions." Need we add to this the obloquy which has been cast upon our country by the herd of tourists and travellers who have attempted to describe it. With some of them, our soil is destitute of prolific power, our atmosphere teems with disease and death, our lives are comparatively short, our institutions are tottering under debility and decay, our national

character is marked with all the traits of premature corruption and precocious turpitude, our manners are barren of refinement, and our minds are destitute of learning and incapable of great intellectual exertion. When we adventure into the fields of science the master spirits, who preside over transatlantic literature, view us with a sneer of supercilious contempt or with a smile of complaisant superiority; and consider our productions as Oases in the regions of Africa; deriving their merit less from intrinsic beauty and excellence, than from their contrast with the surrounding deserts. And it has even been gravely proposed, as a subject for inquiry, whether the discovery of America has been advantageous or prejudicial to mankind! (1)

While we look down upon these aspersions it is due to candour, and a just estimate of our own character, to acknowledge that generally speaking, we are far behind our european brethren in the pursuits of literature. The enterprising spirit which distinguishes our national character, has exhibited itself in every shape except that of a marked devotion to the interests of science. There is nothing in the fixed operation of physical or moral causes, nothing in our origin, in our migration or in our settlement; nothing in our climate, our soil, our government, our religion, our manners, or our morals, which can attach debility to our minds or can prevent the cultivation of literature. Two hundred years have nearly elapsed since the first european settlement was made in this state; and if, in the course of two centuries, labouring under difficulties of various kinds, we have not attained the first elevation in the ranks of knowledge, surely sufficient reasons may be assigned without impeaching the character of our minds or degrading us in the scale of being. Although in a review of these causes, which I shall now attempt with all possible brevity, my remarks relate particularly to this state, they will apply, generally speaking, to the United States at large.

Ancient migrations were generally the offspring of want. Sometimes a whole people departed from their natal soil, and sought for better destinies in a milder climate and a more prolific land. Sometimes, when population became surcharged, and subsistence difficult, a portion of a nation would change its habitation: at other times, colonies were planted for the purpose of retaining conquered countries and checking the predatory incursions of barbarian hordes. A different principle seems to have led to the first colonization of America. The discovery of this western world appears to have infused a new spirit into Europe: the imaginations of men were dazzled with fabulous stories of dorados, or mountains of gold, and of fountains by which the human race flourished in immortal youth. In this land the god of wealth was supposed to have erected his temples, and his votaries flocked from all quarters to propitiate his blessings. When experience had sobered the distempered fancies of these adventurers, and had convinced them of their delusion, they still discovered that, although the precious metals were not within their

grasp, yet that their cupidity could be amply gratified by the abundant products of the soil. The settlement of this country was thus made with a view to the acquisition of wealth; knowledge was out of the question. The attachments of the emigrants, like their origin, were exotic; the land of their adoption was considered as secondary and inferior, in every respect, to the land of their nativity; and their anxious eyes were constantly directed to the period when they could return to their native soil laden with the bounties of the new world. This country was also planted at a time when the intellectual world was involved in cimmerian darkness. The scholastic philosophy was the reigning knowledge of the times;—a philosophy of words and notions, conversant only in logical distinctions, abstractions, and subtleties; which left real science wholly uncultivated to hunt after occult qualities, abstract notions, and objects of impertinent curiosity. This system, which was founded by the commentators on Aristotle, who were called profound, irrefragable, and angelic doctors, corrupted every department of knowledge and maintained its supremacy for several centuries. The stagyrite was even considered as entitled to the honours of an evangelist; and Melancthon complains that his ethics were read to the people, instead of the gospel, in sacred assemblies. In this great serbonian bog the human mind lay ingulfed, entranced, and bewildered for ages; and the glimmering rays of light which the peripatetic philosophy shed over the world, were confined to the cloister and the college. At this period this country was first settled by the countrymen indeed of Erasmus and of Grotius; but the works of Erasmus were locked up in latin;—Grotius was scarcely known, and few of our ancestors were acquainted with the first elements of knowledge. They settled here under the auspices of a dutch west-india company, and when the province was surrendered to the english, in 1674, no advantages resulted to the cause of knowledge. Charles II. was a witty sensualist—James II. was a contracted bigot—William of Orange was a mere soldier. The constellation of intellectual luminaries which shone in the augustan age of England diffused but little light across the Atlantic: the two first of the Brunswick kings had neither knowledge themselves, nor did they value it in others; and with the third dynasty we measured swords, and a severance of the empire ensued.

There is something in the nature of provincial government which tends to engender faction, and to prevent the expansion of intellect. It inevitably creates two distinct interests; one regarding the colony as subservient in every respect to the mother country, and the other rising up in opposition to this assumption. The governor and principal magistrates, who derive their appointments from an extrinsic source, feel independent of the people over whom they are placed. The operation of this principle has been powerfully experienced in our territorial governments, which have been the constant theatre of intestine divisions; and when the human mind is called away from the interest of

science to aid, by its faculties, the agitations of party, little can be expected from energies thus perverted and abused. The annals of our colonial state present a continual controversy between the ministers of the crown, and the representatives of the people. What did the governor and judges care for a country where they were strangers? where their continuance was transient; and to which they were attached by no tie that reaches the human heart. Their offices emanated from another country;—to that source they looked for patronage and support, to that alone their views extended; and having got, what Archimedes wanted, another world on which to erect their engines they governed this at pleasure.

The colonial governors were, generally speaking, little entitled to respect. They were delegated to this country not as men qualified to govern, but as men whose wants drove them into exile; not as men entitled by merit to their high eminence, but as men who owed it to the solicitations of powerful friends and to the influence of court intrigue. Thus circumstanced and thus characterized, is it wonderful to find them sometimes patrolling the city disguised in female dress; at other times assailing the representatives of the people with the most virulent abuse, and defrauding the province by the most despicable acts of peculation; and at all times despising knowledge and overlooking the public prosperity? Justice, however, requires that we should except from this censure Hunter and Burnet. Hunter was a man of wit, a correspondent of Swift, and a friend of Addison.⁽²⁾ Burnet, the son of the celebrated bishop of Salisbury, was devoted to literature; they were the best governors that ever presided over the colony.

The love of fame is the most active principle of our nature. To be honoured when living,—to be venerated when dead,—is the parent source of those writings which have illuminated,—of those actions which have benefited and dazzled mankind. All that poetry has created, that philosophy has discovered, that heroism has performed, may be principally ascribed to this exalted passion. True it is,

“When fame’s loud trumpet hath blown its noblest blast,
Though long the sound, the echo sleeps at last;
And glory, like the phoenix ’midst her fires,
Exhales her odours, blazes, and expires.”

Lord Byron.

Yet, as long as man is susceptible of sublime emotions, so long will he commit himself to this master feeling of a noble nature. What would have become of the sublime work of Milton, if he had written for

the fifteen pounds which he received from the bookseller; and where would have been the writings of Bacon, if he had not aspired to immortal fame? "My name and memory," said this prince of philosophers, in his will, "I leave to foreign nations, and to my own countrymen after some time be passed over." When with one hand he demolished the philosophy of the schools, and with the other erected a magnificent temple dedicated to truth and genuine knowledge, he was animated in his progress, and cheered in his exertions by the persuasion that after ages would erect an imperishable monument to his fame.

But in order that this passion may have its full scope and complete operation it is not only necessary that there should be a proper subject, but a suitable place and an enlightened public. The actor, in order to act well his part, must have a good theatre and a respectable audience. Would Demosthenes and Cicero have astonished mankind by their oratory, if they had spoken in Sparta or in Carthage? would Addison have written his *Spectators* in Kamtschatka, or Locke his work on the *Understanding* at Madrid? destroy the inducement to act, take away the capacity to judge, and annihilate the value of applause, and poetry sinks into dulness; philosophy loses its powers of research; and eloquence evaporates into froth and mummery.

A provincial government, like ours before the revolution, was entirely incompetent to call into activity this ennobling propensity of our nature. A small population, scattered over an extensive country, and composed almost entirely of strangers to literature; a government derivative and dependent, without patronage and influence, and in hostility to the public sentiment; a people divided into political and religious parties, and a parent country watching all their movements with a stepmother's feelings, and keeping down their prosperity with the arm of power, could not be expected to produce those literary worthies who have illuminated the other hemisphere.

History justifies the remark that free governments, although happier in themselves, are as oppressive to their provinces as despotic ones. It was a common saying in Greece that a free man in Sparta was the freest man; and a slave, the greatest slave in the world. This remark may be justly applied to the ancient republics which had provinces under their controul. The people of the parent country were free, and those remote were harrassed with all kinds of exactions, borne down by the high hand of oppression, and under the subjection of a military despotism. The colonial system of modern times is equally calculated to build up the mother country on the depression of its colonies. That all their exports shall go to and all their imports be derived from it, is the fundamental principle. Admitting occasional departures from this system, is it possible that an infant country, so bandaged and cramped, could attain to that

maturity of growth which is essential to the promotion and encouragement of literature? Accordingly we do not find in any colony of modern times any peculiar devotion to letters, or any extraordinary progress in the cultivation of the human mind. The most fertile soil,—the most benign climate,—all that nature can produce and art can perfect, are incompetent to remove the benumbing effects which a provincial and dependent position operates upon the efforts of genius.

These difficulties, so embarrassing, were augmented from other causes. The population of this colony was derived from several nations. The original emigrants were dutch. The next in order of time were from England. The revocation of the edict of Nantz, and the persecutions in the Palatinate, occasioned considerable migrations from France and Germany; Scotland and Ireland also furnished a great accession of inhabitants. Four different languages were for a long time used; and the people were separated from each other by a diversity of manners and opinions, and strong national prejudices. How, then, was it possible to combine their energies in any common effort? Two centuries have not entirely extinguished the lines of national separation. The dutch and german languages are still spoken in some settlements. Five or six generations have, in a great measure, amalgamated these discordant elements. National antipathies have subsided, a national character has been formed, and a national physiognomy is supposed to be established. The triumph and general adoption of the english language have been the principal means of melting us down into one people, and of extinguishing those stubborn prejudices and violent animosities which formed a wall of partition between the inhabitants of the same land. In a country whose population was thus composed, it was not to be expected that a great taste for literature would be considered an essential accompaniment.

The government of Great Britain discountenanced emigrations. Transportation to the colonies was declared to be the punishment for many felonies. "It is a shameful and unblessed thing," said Bacon, "to take the scum of people; and wicked, condemned, men to be the people with whom you plant; and not only so, but it spoileth the plantation." This measure was, no doubt, the result of design, the dictate of policy. It inculcated upon the public mind that the colonies were a place of punishment, not a country enjoying the blessings of life; and it prevented that copious flow of migration which the necessities of the people, and the hope of enjoying better fortunes in another land, would have unquestionably effected. Although the relegation of convicts to this country could not seriously affect the morals of the american people, or materially disturb their internal tranquillity, yet it certainly injured our character in the general estimation of Europe. The british government has established one great settlement for convicts; there can be little doubt but that the same sentiment existed at one period, in the

INTRODUCTORY DISCOURSE.

3

old world, with respect to this country, as now prevails here in relation to Botany Bay : and what respectable man could be induced to remove to that place? what encouragement would it afford to the cultivation of literature? the pierian spring and the parnassian mount are not to be expected in the den of Cacus. The idea of a country appropriated as the residence of men whose lives have been polluted with crimes, is associated with all that is shocking and appalling; and we consider it in the same light as the poet represents the entrance into the infernal regions :

“ Luctus, et ultrices posuere cubilia curæ;
Pallentesque habitant morbi, tristisque senectus,
Et metus, et malesuada fames, et turpis egestas;
Terribiles visu formæ! Lethumque, laborque;
Tum consanguineus Lethi sopor, et mala mentis
Gaudia; mortiferumque adverso in limine bellum,
Ferreique Eumenidum thalami, et discordia demens,
Vipereum crinem vittis innexa cruentis.”

ÆNEID, lib. VI.

The combined and pernicious effects of this complication of causes were to be traced in the general want of education—in the debased condition of the learned profession,—in the neglect of seminaries of learning—and in an universal apathy with regard to the interests of science.

The influence of printing, upon knowledge, is well understood. During the dutch government no press was established. Governor Dongan was instructed, in 1686, to allow no printing press in the province. The first established was 1693, and the first newspaper published was on the 16th of October, 1725.

Whatever may be thought of the following remarks of sir William Temple in other respects their justice, in relation to the medical profession, must be universally acknowledged. “ It is certain, however,” says that distinguished writer, “ that the study of physic is not achieved in any eminent degree without very great advancements in the sciences; so that whatever the profession is, the professors have been generally very much esteemed on that account as well as of their own art; as the most learned men of their ages and thereby shared, with the two other great professions, in those advantages most commonly valued and most eagerly pursued; whereof the divines seem to have had the most honour—the lawyers the most money—and the physicians the most learning.”

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Hippocrates was profoundly skilled in natural knowledge before he commenced the study of medicine; and it has become a common saying that, where the natural philosopher ends the physician begins. The laws which regulate other material substances, apply to the human body. Chymistry is all essential to a physician. "I do not hesitate to pronounce," said Fourcroy, "that modern chymistry has done more, in twenty years, for medicine, than all the united labours of preceding ages." The materia medica is supplied from the three kingdoms of nature. Without a knowledge of botany, mineralogy, and zoölogy, a physician cannot understand the medicines he prescribes; and as the nomenclature of his profession is derived from the learned languages, and principally from the greek, he ought to be a classical scholar: in a word, he should have a general acquaintance with all the departments of human knowledge, in order to compose that learned man which is expected from an able and accomplished physician.

With this elevated idea of the medical character, how must we be mortified to find the low state of the profession during the greater period of the colonial government. It was totally unregulated; and the apothecary, physician, and surgeon, were united in the same individual. "Quacks," said the colonial historian, "abound like locusts in Egypt." A periodical writer, who published in 1752, estimated the number of families in this city to be two thousand, and the number of physicians to be forty; which would make one physician for every fifty families; and he further stated that he could show, by "probable arguments, that more lives are destroyed in this city by pretended physicians, than by all other causes whatever."* Nor was the profession of the law on a more respectable footing. As there was no distinction of degrees, the attorney and the counsellor were blended together; and the profession was disgraced by the admission of men not only of the meanest abilities, but of the lowest employments.

While the theological profession exhibited a more respectable appearance from the transatlantic education of many of our divines, the state of our seminaries of learning displayed a most humiliating spectacle. "Our schools," says the colonial historian, "are in the lowest order. The instructors want instruction; and through a long, shameful, neglect of all the arts and sciences, our common speech is extremely corrupt; and the evidences of a bad taste, both in thought and language, are visible in all our proceedings, public and private." And, at that time, there were instances of some magistrates who were totally ignorant of the first rudiments of instruction.

Amidst the intellectual darkness which covered the land, some corruscations of light were to be seen darting through the gloom. A prolific

* Independent Reflector

soil and an enterprising spirit had, in some degree, surmounted the disadvantages of a colonial state; and the general ease and plenty which prevailed through the province, called off the attention of many from the pursuits of laborious occupations to the cultivation of the mind. The value of education was estimated as the privation of it was experienced; and many young men were sent to the colleges of the eastern colonies, and to the universities of Great Britain, for the benefits of education. Some of our lawyers were brought up in the Inns of court, and some of our physicians were instructed in the celebrated schools of London and Edinburgh.

This bias of the human mind, to emancipate itself from the slavery of ignorance, appeared in a variety of other shapes. In 1754 a public library was founded in this city. On the 31st of October, in the same year, King's (now Columbia) College received its charter; and the first commencement was held in 1758. A faculty of medicine was annexed to that institution in 1769, and Clossy, Bard, Jones, and Middleton, men of great eminence, were appointed to direct its destinies. A general taste for science and literature began to exhibit itself. At the head of those distinguished men, who devoted themselves to the interests of knowledge, may be justly placed Cadwallader Colden a man of great mental acumen and of extensive acquirements: he was, for a long time lieutenant governor of the province; and he spent a great portion of a long life in the cultivation of letters and in a literary correspondence with Linnæus, Franklin, and the other illustrious savans of the age. He illustrated the botany of this country, composed many interesting works, was intimately acquainted with the newtonian philosophy, and was learned in his profession as a physician. A history of the colony was written by William Smith, whom Dr. Robertson has denominated the ingenious historian of New-York. Attempts were made to emulate the periodical writings which adorned the literature of Great Britain. In 1752 several weekly essays were published under the title of the Independent Reflector. Although at this day there appears nothing exceptionable in them, yet they did not suit the temper of the times; they excited the resentment of some of the leading men; and a clergyman denounced the writer from the pulpit, and compared him to Gog and Magog. The printer was finally menaced into a discontinuance of the publication, and it expired with the 52d number. In 1755 a series of well-written essays, under the title of the Watch-Tower, was published in the New-York Mercury printed by Hugh Gaine.

The public attention was, however, principally engrossed in religious controversies. In the time of governor Fletcher the episcopalians were favoured with a partial establishment in this and three of the neighbouring counties. This exceptionable measure excited much uneasiness; and a proposition to establish bishops in America, although reasonable in itself, was resisted with great zeal; and produced a long and violent

polemic war, which was conducted with great talents. Our dutch ancestors were agitated about a question relative to their own church: whether their clergy might be ordained in this country without the sanction of the classis of Amsterdam: and the french and presbyterian churches were also torn asunder by internal feuds.

Some of these jealousies and controversies affected literary objects and procrastinated, for a considerable time, the establishment of a college. Pamphlets were written not only as to the government, but the site of the institution;—whether it should be under the control of a particular sect,—whether it should be in the city or county were questions debated with great earnestness. Although these agitations had a beneficial effect in exciting the mind to action, yet it is to be regretted that such talents and powers were expended in a way so little calculated to subserve the solid interests of science. From this barren soil no substantial harvest of improvement could be reaped; and if the same quantity of intellect, which has been appropriated to unproductive and interminable controversies, had been applied to the promotion of genuine science, the boundaries of knowledge would have been greatly enlarged and the honour and happiness of the human race would have been essentially promoted.

Mental, in many cases, acts directly the reverse of corporeal vision; and magnifies objects, not in proportion to their propinquity but in the ratio of their distance. This obliquity of the human mind springs from a variety of causes, and operates in a variety of directions. It incessantly magnifies the talents and morals of the past, at the expense of the present times; and its wanderings never appear in a more striking view than in its judgments of men. By its magic influence the dwarf of antiquity starts up into a giant; and, like the phenomenon called the Mirage, it translates the men and the things of this earth to the skies. These remarks are made, not to depreciate those who have gone before us, but to warn us not to depreciate ourselves. The panegyrics which have been pronounced upon the works of some of our predecessors appear strange, when we consider their writings with an unprejudiced mind; and, perhaps, the same observation may, without arrogance, be applied to many of the divines, the physicians, the jurists, and the statesmen whose praises have reached us through the organ of tradition, and whose memories have descended to us adorned with the laurels of genius: but let not this discourage exertion:—what they are to us! many of you will deservedly be to future generations; and the pious feelings of posterity may cherish your worth with equal ardour and embalm you in their hearts with equal affection.

The spring which was given to the human mind; the improvement which seminaries of education produced; and the general, extensive, and augmented popularity of intellectual illumination, paved the way for those political discussions which ushered in the american revolution, and

finally dismembered the british empire. The study of the law as a liberal profession, necessarily leads to investigations with regard to the origin of government, the constitutions of states, and the objects of jurisprudence. The influence of this profession upon the political events of the times could not escape the sagacity of Burke: he assigns it as one of the causes of the revolution. "This study," says he, "render men acute, inquisitive, dexterous, prompt in attack, ready in defence, full of resources. In other countries the people, more simple and of a less mercurial cast, judge of an ill principle in government by an actual grievance: here they anticipate the evil, and judge of the pressure of the grievance by the badness of the principle; they augur misgovernment at a distance, and snuff the approach of tyranny in every tainted breeze."*

The statesmen who appeared at the dawn of the revolution attracted the admiration of Europe; and the masterly state papers which our state convention, and the general congress promulgated, breathed the genius of Greece and the invincible spirit of Rome; and covered with glory the american name. "When," said the elder Pitt, "when your lordships look at the papers transmitted us from America;—when you consider their decency, firmness, and wisdom, you cannot but respect their cause and wish to make it your own. For myself I must declare and avow, that in all my reading and observation,—and it has been my favourite study, (I have read Thucydides, and have studied and admired the master states of the world,) that, for solidity of reasoning, force of sagacity, and wisdom of conclusion, under such a complication of difficult circumstances, no nation or body of men can stand in preference to the general congress at Philadelphia."†

The convulsions, devastations, and horrors which attended the revolution were ill calculated to cherish the interests of science. Our seminaries of education were broken up; and all our attention was occupied in resisting the calamities which pressed upon our country. The restoration of peace opened brighter prospects; but an unsettled government, and a variety of other obstacles, prevented for a time much attention to literature. In imitation of the Royal-Society of London, which was established at the close of the civil wars, an attempt was made to found a philosophical society in this city in 1784, but it perished in embryo. King's-College was revived on the 13th of April, 1784, under the name of Columbia-College. Union-College was founded in 1795. Hamilton-College, in 1812; and there are now near forty incorporated academies dispersed over the state, which probably contain about three thousand scholars. A Botanic-Garden was founded in the vicinity of this city in 1801.(3) A College of Physicians and Surgeons

* Speech on conciliation with America.

† Speech on a motion to remove the troops from Boston.

was established in this city in 1807,(4) and another has been recently instituted in the county of Herkimer. The medical profession has been regulated and placed on a respectable footing. Theological seminaries of great merit have been founded. The profession of the law has also been attended to; regular examinations are necessary to insure admission; the degree of counsellor has been separated from the vocation of attorney; and able reports of the decisions of the superior courts are regularly published. A Society for the Promotion of Agriculture, Arts, and Manufactures, was instituted in 1791; and in 1804 it was reorganized under the name of the Society for the Promotion of Useful Arts: its meetings are held at Albany during the sessions of the legislature; and under the auspices of its late and much-lamented presiding officers, Livingston and L'Hommedieu, and several other public-spirited men, it has published many valuable papers and has greatly improved the agriculture of the State. An Historical Society was also incorporated in 1809, and an Academy of Fine Arts in 1808; which have made valuable appropriate collections, and which want nothing but more encouragement from the public, and more attention from the members, to become highly useful to the community.(5) Several works of great usefulness have been published; among which the Medical Repository, the American Medical and Philosophical Register, and the Mineralogical Journal, hold distinguished rank. And we have several intelligent and enterprising booksellers, the natural and efficient patrons of literature in all countries.

A vast fund, amounting to a million and a half of dollars in value, has been appropriated to the support of common schools; and that wonderful improvement, the lancasterian system, has obtained a firm footing. Our academies and colleges are well endowed, and the blessings of education are generally diffused; and, to a considerable extent, within the reach of the poorest children in the community.

But, although there is a vast mass of knowledge spread over the state, yet it is, generally speaking, of the common kind; all know the elementary parts of instruction, but few know the higher branches of science; and there is not so much concentrated knowledge in so many individuals, as in Europe. This arises from a number of causes which do not disparage our intellectual character, and which, it is to be hoped, will cease to operate after a short time.

In the first place we have, with scarcely any intermission, been distracted by party spirit! in its bitterest forms of exacerbation. Our ingenuity has been employed, not in cultivating a vernacular literature, or in increasing the stock of human knowledge; but in raising up and pulling down the parties which agitate the community. This violent spirit has split society asunder, has poisoned the intercourse of private life, has spread a morbid gloom over our literature, has infected the

national taste, and has palsied the general prosperity. Whatever apologies may be made for these political discussions, by ascribing them to an honest difference in opinion, there can be none offered for the style and manner in which they are conducted. In reading the classical works of the ancients we are astonished at the violations of decorum which appear in their most polite and accomplished authors; who frequently use expressions that no modern writer dare adopt without the certainty of condemnation. But if we excel the ancients in this respect, we are far behind them in other branches of literary good morals. The style of our political writings has assumed a character of rude invective, and untrained licentiousness, unparalleled in any other part of the world; and which has greatly tended to injure our national character. This has principally arisen from the indiscriminate applause that has been conferred upon certain eminent political writers. We imitate what we are taught to admire; and unfortunately we have aped their boldness of invective, and fierceness of denunciation, without exhibiting those fascinations of genius, which operate like the cestus of Venus; conceal deformity, and heighten all the charms of beauty and grace. Junius arose in the literary, like a comet in the natural world, menacing pestilence and war; and denouncing, in a style of boldness and invective before unknown and unheard of, the constituted authorities of Great Britain. When we analyze his writings, we find no extraordinary power of imagination,—no uncommon extent of erudition,—no remarkable solidity of reasoning. His topics are few; but he was master of his subject. He possessed, in a singular degree, the *vivida vis animi* :* his conceptions were distinct and luminous, and he expressed them with peculiar point and sententious compression; but the polished keenness of his invective too often degenerated into vulgar scurrility. His importance was greatly enhanced by the mystery which surrounded his person,—the panic which followed his denunciations,—and the celebrity which was attached to his literary antagonists. He created a new era in political writing; his works have become the archetype and the text book of political authors; and every juvenile writer, who enters the political lists, endeavours to bend the bow of Ulysses; and, in striving to make up in venom what he wants in vigour mistakes scurrility for satire, ribaldry for wit, and confounds the natron of Egypt with the salt of Attica.

Secondly; after expressing my profound regret that those exalted and highly cultivated minds, which have been engaged in polemic controversies, had not bent more of their attention to literary investigations; I consider it my duty to remark, with every sentiment of respect and regard, that the medical profession, instead of making one harmonious

* *Latrocinio*.

and undivided effort in favour of enlarging the dominion of knowledge, have hitherto been called away from this opus basilicum, this sublime operation, by the prevalence of intestine feuds and animosities. It is unnecessary to explore the cause; perhaps it is inherent in the profession. The sources of most diseases are concealed from observation, and can only be the subject of conjecture. Add to this, that the same prescription which has succeeded in one case, may fail in another; owing to different constitutions, different seasons, and the action of other causes. "The matter is evident," says the profound Buffier, "from the different arguments of physicians, and from their various opinions in the daily consultations. Nothing is more uncommon than to find physicians united in the same sentiments."* This constant and habitual tendency to collision has been seriously felt in this city. Instead of erecting one grand temple dedicated to the healing art we have had, at one time, three different seminaries in operation for medical instruction.

Thirdly; there have been great inertness and backwardness on the part of the legal profession, to encourage general literature. After the forms of a preliminary education are passed, the lawyer, is too apt to devote himself exclusively to the learning of his profession: and, as many of our lawgivers and statesmen are derived from this source, we cannot but perceive and regret this dearth of general knowledge in our legislatures as well as in our forums. How seldom do we hear those classical allusions, those literary references, which enliven the tedium of abstract discussion; and illustrate, with streams of light, the darkest topics of investigation! and this defect is exhibited in many of our state papers; which resemble more the technical discussions of the advocate, than the luminous productions of the diplomatist. The greatest intellectual luminary that ever rose in a benighted world was Francis Bacon, a lawyer by profession. His rival and antagonist at the bar was Coke. They were both eminent in their profession; and attained its highest honours, and most lucrative emoluments. Bacon became a lord-high-chancellor, and Coke a chief-justice. The former had ascended the empyreal heights of literature;—the latter had plunged into the learning of Norman lawyers, and had become the oracle of the common law. The works of Bacon are referred to as the oracles of truth and knowledge, and as the revelation of genuine philosophy; while the black letter learning of Coke is an eleusinian mystery to all out of the pale of the profession. The difference between a mere lawyer great in his profession alone, and a great lawyer eminent in literature and science, can never be more forcibly illustrated than in the intellectual exhibitions of these celebrated men. Bacon enlivened, en-

* Treatise on First Truths, p. 60.

riched, and embellished every subject upon which he wrote : even flowers sprung up under his feet in his journey through the thorny paths of legal investigation ; but from Coke you must expect nothing but the dry, barren weeds of scholastic subtlety and norman chicanery.

Fourthly ; the energies of our country have been more directed to the accumulation of wealth than to the acquisition of knowledge. Our enterprising spirit, as exhibited in the fisheries, in navigation, and in commerce, is the admiration of the world ; and if it had soared to the heavens in pursuit of knowledge, instead of creeping along the earth in the chase of riches, America would have been as illustrious in the rolls of fame as those states where literature has seen her august ages. There is nothing in the commercial spirit which is hostile to literature. On the contrary, the wealth which it produces furnishes both incentives and rewards. The illustrious family of the Medici were merchants in their origin, and to them we are indebted for the resurrection of letters ; but let us fervently hope that after this passion, so energetic, is satiated in its present pursuit, it may seek more sublime sources of gratification.

“ To either India see the merchant fly,
Scared at the spectre of pale poverty ;
See him, with pains of body, pangs of soul,
Burn through the tropic, freeze beneath the pole !
Wilt thou do nothing for a noble end,
Nothing to make philosophy thy friend ?”

Pope's Imitation of HORACE.

Fifth, and lastly ; in Europe, there is a literary corps who are authors by profession. Here we have scarcely any person of this description, and we have not much vernacular literature. The consequences are obvious : while books are written beyond the Atlantic as a matter of course, they are here the offspring of some accidental direction ; there the seed is, at all events, thrown into the ground and the harvest is reaped ; while here we rely upon the fortuitous produce of the chase, or the occasional supplies of the stream. This condition of things has inculcated upon us the vast superiority of Europe, and has made us despair of successful competition. America leans for literary support upon Europe ; and we have been too much in the habit of estimating the value of books by the place of their origin. The time will surely arrive when an eminent american author shall be no longer considered an anomaly, deriving his celebrity more from the singularity than the merit of his productions.

Our colonial historian has, unadvisedly, stated that “ the inhabitants of this colony are, in general, healthy and robust ; taller, but short

lived, than europeans ;** and a french abbé,† who was attached to count Rochambeau's army, and who published a small book of travels, visited some of our church yards ; and seeing, or fancying that he saw on the tombstones, but few notices of persons who had attained considerable longevity has hazarded this general conclusion, that the americans are shorter lived than the people of Europe. Censuses have been taken of this city and state, and of the United States, at various times, and with unquestionable accuracy. Bills of mortality have been kept here ; and in Philadelphia, Boston, and some other towns ; and tables of the number of births have also been collected in a few places. On comparing the births with the whole population, the deaths with the whole population, the number of births with the number of deaths, and considering our rapid augmentation of inhabitants, doubling in some states in thirteen or fourteen years, and upon a general average in every twenty or twenty-three years, there can be no doubt but that the United States have a decided advantage over the healthiest parts of Europe. While in Paris, London, and Amsterdam, there are more deaths than births, it is ascertained that, in our great cities, there are at least two births to one death. The charges which have been brought against the supposed deleterious effects of our climate, upon the human body, have been thus refuted with the certainty of demonstration.

The imputation of an unfriendly influence upon the mind is equally groundless. Although there is, in all probability, some strong affinity between climate and genius yet we have no reason to repine at our lot ; for the peculiarities which distinguish us in this respect are not unfavourable to intellectual energy. The connexion between the mind, and the body, is universally admitted ; and the country which administers to the beauty, the strength, and the health of the latter, cannot derogate from the vigorous faculties of the former. We have more rain, more evaporation, more sunshine, and a greater number of clear days than they have in Europe : our atmosphere, it is supposed, contains more electrical fluid ; and we are exposed to greater extremes of heat and cold. We have no season corresponding with the european spring ; but the greater part of our autumn is unparalleled for beauty, pleasantness, and salubrity. These qualities of our climate are by no means hostile to the growth of the intellect ; on the contrary, most of them are highly friendly to the excitement of genius ; and we cannot better express our ideas on this subject than by adopting the language of a distinguished member of this society : " If genius, industry, erudition, and the liberal arts, are begotten and nourished in a temperate climate and a pure atmosphere, America has much to expect ; for the climate will

* Smith's history of the province of New-York.

† Abbe Robin.

ever be temperate, and the atmosphere pure, through the greater part of the continent."*

With respect to the fertility of our soil, the excellence and abundance of its products, and the luxuriant power of vegetation, there can be no dispute. Famine has never been heard of; and if facility of subsistence, salubrity and plenty of food, and all the comforts of life, can produce that composure and serenity which are generally necessary to elicit the powers of the mind, there is no country which can claim a superiority over the United States.

The nature of our government and the constitution of our confederacy, are admirably adapted to promote the interests of science. Free governments are the native soil of great talents. "Though a republic should be barbarous," says Hume, "it necessarily, by an infallible operation, gives rise to law even before mankind have made any considerable advances in the other sciences; from law arises security; from security curiosity, and from curiosity knowledge."† That most profound political writer, whom I have just quoted, with the vast volume of history before his eyes, and aided by all the powers of an analyzing and investigating mind, has laid down the following incontrovertible propositions in relation to the influence of government upon the arts and sciences,

1. It is impossible for the arts and sciences to arise, at first, among any people unless that people enjoy the blessing of a free government.

2. Nothing is more favourable to the rise of politeness, and learning, than a number of neighbouring and independent states connected together by commerce and policy.

3. Though the only proper nursery of these valuable plants be a free government, yet may they be transplanted into any government; and a republic is most favourable to the growth of the sciences, a civilized monarchy to that of the polite arts.‡

Although this was published more than half a century ago, yet it suits our situation so precisely that one would suppose the writer had the United States fully in his view. Perhaps the flourishing condition of the literature of Europe is, in a great degree, owing to the division of that continent into a number of independent states. Each capital is a place where letters are encouraged, and the different governments vie with each other in rewarding the effusions of genius; but if Charles V., Lewis XIV., or Napoleon, had succeeded in establishing an universal monarchy the dark ages of gothic barbarity would have revisited mankind. Thus, under the direction of an all-wise and beneficent God, the half-civilized serf of Russia has become the unconscious guardian and protector of

* Williamson on the Climate of America, p. 177.

† Hume's Essays, vol. I. 14th Essay.

‡ Ibid.

knowledge. The small country of Attica, not so large as Long-Island, can never be contemplated without the mingled emotions of veneration and sorrow. "Ab Athenis enim humanitas, doctrina, religio, fruges, jura, leges, ortæ, atque in omnes terras distributa, putantur." "It is acknowledged," said Cicero, "that literature, polite arts, religion, agriculture, laws, and social rights, originated in Athens and were thence distributed over all nations." The fertility of the soil, the excellence of the climate, the freedom of the government, and the enterprising spirit of the people, must have coöperated in producing this transcendent and preëminent state of human exaltation. And if a comparison was instituted in those respects, between that country and ours, in what important part would we be deficient?

We are, perhaps, more favoured in another point of view. Attica was peopled from Egypt; but we can boast of our descent from a superior stock. I speak not of families or dynasties; I refer to our origin from those nations where civilization, knowledge, and refinement have erected their empire; and where human nature has attained its greatest perfection. Annihilate Holland. Great Britain, Ireland, France, and Germany, and what would become of civilized man? this country, young as it is, would be the great Atlas remaining to support the dignity of the world: and perhaps our mingled descent from various nations may have a benign influence upon genius. We perceive the improving effects of an analogous state upon vegetables and inferior animals.* The extraordinary characters which the United States have produced may be, in some measure, ascribed to the mixed blood of so many nations flowing in our veins; and it may be confidently predicted that the operation of causes, acting with irresistible effect, will carry in this country all the improvable faculties of human nature to the highest state of perfection.

Taking it for granted that the United States afford every reasonable facility and inducement for the cultivation of letters, it cannot be doubted but that this city is the proper scite for a great literary and scientific institution. When we view the magnitude of its population, the extent of its commerce, the number of its manufactures, and the greatness of its opulence; when we contemplate its position near the Atlantic, its numerous channels of communication by land and by water with every part of the United States, and the constant and easy intercourse it can maintain with all parts of the civilized world; when we consider the vast fund of talent, information, enterprise, and industry which it contains; and when we take a prospective view of the rank which it is destined to occupy as the greatest commercial emporium in the world, we must acknowledge that no position could be selected better adapted for acquiring information, concentrating knowledge, improving literature, and extending science: and we may say of this place as Sprat, in his history of the Royal-Society, said of London: "It has a large intercourse with all the

earth ; it is, as the poets describe their house of fame, a city where all the noises and business in the world do meet, and therefore this honour is justly due to it, to be the constant place of residence for that knowledge which is to be made up of the reports and intelligence of all countries."*

The Royal-Society of London, for the improving of natural knowledge, (the first institution of this kind,) was established about the year 1663. Butler, the author of *Hudibras*, wrote a satire against it entitled "The elephant in the moon." Sprat, the historian of the society, feeling too acutely the shafts of ridicule, attempted in a singular way to propitiate the hostile wits. "To gain their good will," said he, "I must acquaint them that the family of Railleurs is said to be derived from the same original with the philosophers. The founder of philosophy is confessed by all to be Socrates, and he also was the famous author of all irony. They ought, therefore, to be tender in this matter, wherein the honour of their common parent is concerned."†. Cowley, on the other hand, wrote a complimentary address to the society.

The satire of Butler has sunk into oblivion, while the society which it assailed has established a reputation and usefulness that cannot be subverted or denied. From its origin to the end of the eighteenth century (as appears from dr. Thompson's history of the Royal-Society from its institution to the end of the eighteenth century) it has published 4,166 memoirs on natural history, anatomy, surgery, medicine, mathematics, mechanical philosophy, chymistry, and miscellaneous subjects; the greatest number of which is on astronomy, medicine, and chymistry. The institution of this society was soon followed by that of the Royal Academy of Sciences at Paris, and similar associations have been since formed in almost all the important cities of Europe.

The first society of the kind in this country was the American-Philosophical-Society, held at Philadelphia, for promoting useful knowledge, which was founded in 1769; its principal promoter was dr. Franklin : (6) it has published six volumes of transactions. The American Academy of Arts and Sciences was incorporated in Massachusetts in 1780; and the Connecticut Academy of Arts and Sciences was established in 1799. All these institutions have given to the world several useful and interesting memoirs. The United States Military Philosophical Society was founded at West Point, in this state, in 1802, by colonel Williams, chief of the Corps of Engineers, and Military Academy. The whole corps of engineers were the original members; and its number has been increased by the admission of others from different parts of the United States. This attempt to diffuse science has been attended with remarkable success, and was worthy of the gentleman who inherits the investigating mind as well as the blood of dr. Franklin. The travels and discoveries of Pike, the

* Sprat's History of the Royal Society.

† Ibid.

history of Louisiana by Stoddard, the code of Martial Law by Macomb, a treatise on the Organization of Artillery by Morton, several important military memoirs by the president of that institution, and the system of maritime defence adopted, and now visible in our harbour, may be considered as emanations from it.

Such associations are productive of great individual and collective benefit: they stimulate the mind to exertion, produce emulation, and form habits of observing with accuracy and of reading with attention; they elicit powers that would otherwise lie dormant, and collect knowledge that would otherwise be scattered. "Science, like fire, is put in motion by collision."* The communion of cultivated minds must always have a benign influence on knowledge; and the experience of a century and a half bears testimony to this truth.

The objects of the Literary and Philosophical Society of New-York being coextensive with the principal branches of human knowledge, an unbounded prospect of investigation lies before us. It would be an herculean task, far transcending my powers and occupying too much time, to point out those desiderata in science which ought to be supplied; and to indicate those improvements and refinements which ought to be engrafted into our literature; but it may not be unimportant, with respectful deference, and in a very concise manner, to invite your attention to those objects of inquiry which refer to the peculiar situation of this country which have been little attended to or entirely neglected; and which, on account of their peculiar importance, deserve and demand our notice.

In the first place, the geology of our country is almost unknown, and few attempts have been made to elucidate it. William Maclure has, indeed, applied the wernerian system to the United States; has undertaken to divide the country into regions of primitive transition, flatz, and alluvial rocks; and has, upon this plan, delineated those different formations in a geological map of the United States. He has not noticed any volcanic formations; probably from an opinion that none exist.

Dr. Mitchill, in a report made to the Agricultural Society, has divided the state into

The granite country,

The schistic,

The lime stone,

The sand stone, and

The alluvial;

and has designated the different regions in which those divisions exist.

* Transactions of the Literary and Philosophical Society of Manchester.

Volney, borrowing the ideas of Mitchill, without acknowledging the obligation, has applied this theory to the United States at large; and his geological division consists of

- The granite region,
- The region of sand stone,
- The calcarious region,
- The region of sea sand, and
- The region of river alluvions.

He has in one instance, departed from dr. Mitchill's arrangement by substituting a region of sea sand for a schistic region.*

These are the principal attempts which have been made to illustrate our geology; and although entitled to merit they are imperfect; and, probably, to a considerable extent fanciful. Amid the thirty-eight different substances which Maclure has mentioned as composing the different formations, the others have designated but five; and although I presume that the denomination given to a particular region is only intended to indicate that the principal rocks or substances are of the kind from which the appellation is derived, yet it must be obvious, that in such an extent of country it is utterly impossible to arrive at such a conclusion without the most minute and scrutinizing surveys. It is difficult to distinguish and ascertain the different kinds of formations; it requires considerable practical knowledge to discriminate between matter purely inorganic, and its mixture with organic substances; and as strata of different as well as of cognate species are not only piled upon each other, but are frequently buried in the bowels of the earth, there is great difficulty in forming just conclusions. This science, and the kindred science of mineralogy, have been almost entirely uncultivated with us; and when we consider their immense importance, and the extensive investigation which they open, we must be convinced that we ought to devote more than ordinary attention to their cultivation.

The aspect or physiognomy of our country is certainly marked by striking and extraordinary characters. The Hudson is the only river in the United States where the tide passes through the alluvial primitive transition, and into the flatz formation. In the east we have an ocean of salt water. In the west we have fresh-water seas of immense extent: there is every indication, not only of the recession of lakes, but also of their total exsiccation: (7) hence we have three kinds of alluvial formations: one arising from the retreat of the ocean, another from the subsidence or extinction of lakes; and another from the overflowing, retreat, and change of rivers. Marine and vegetable substances are to be found,

* See the Transactions of the American Philosophical Society, vol. 6.—Transactions of the Society of Arts, held at Albany, vol. 1.; and Volney's View of the United States.

particularly in the western parts of the state, embedded in sand stone or in siliceous or calcareous stone; and, besides evidently recognising in them aquatic animals which are well known to us; we perceive a great number of unknown ones that must be pelagian or oceanic, and which must have derived their location from the general submersion of the earth. The *corpu ammonis* has been found near Albany, about which there is a diversity of opinion; some supposing that it is the horn or bone of some animal; while others consider it a native fossil.(8) All these indications support the neptunian theory; but there are several circumstances which denote the agency of an igneous principle. Volney, indeed, supposes that lake Ontario occupies the crater of a volcano; and it is believed that the drowned lands in Orange county exhibit, in many places, strong evidences of volcanic eruptions.

Our principal metals are iron and lead; of inflammable fossils we have made no discoveries of any consequence; although there is, no doubt, plenty of coal. Lime, marble, marl, flint, gypsum, slate for building, clays for manufacturing, and ochres of various kinds have been discovered in great quantities. Salt springs exist in Onondaga, Cayuga, Seneca, Ontario, and Genesee counties; and there is reason to believe that vast strata of fossil salt, commencing at Onondaga as the most easterly point, run west through this state, the back part of Pennsylvania and Virginia; and the states of Ohio, Kentucky, and Tennessee; pass under the bed of the Mississippi river, and finally may be traced in the remotest wilds of Louisiana. A bed of gypsum begins in the town of Sullivan, in Madison county, and branches in a western direction; it is very wide, and its depth has not been ascertained: it appears in several places in the towns of Sempronius, Manlius, and Camillus; but its main body seems to pass through Aurelius, and near the outlets of the Cayuga and Seneca lakes and Phelps town, in Ontario county; and, finally, it is visible at Grand River in Upper Canada.(9) The value of these saline and earthly substances is incalculable: several millions of bushels of salt can be easily made in this state; and three millions are imported in ordinary times. Gypsum formerly came to us in small quantities from France, and our supplies have been derived, for a long time from Nova Scotia. It has created a new era in agriculture: under its influence the wilderness and the solitary place become glad, and the desert rejoices and blossoms as the rose. We have not only a sufficient quantity for our own use, but we now accommodate Pennsylvania with from ten thousand to fifteen thousand tons of this invaluable manure. The state would have been in a truly enviable situation, if correspondent discoveries of coal mines had been made; and the recent refusal of the legislature to promote this important object is seriously to be regretted.

The medicinal and mineral springs with which this state abounds are deserving of further investigation. The springs in Saratoga county are

unrivalled for salubrity; others exist in different places, which have beneficial effects upon health. There are sulphur springs in Otsego, Cayuga, and Ontario counties; and it remains yet to be determined whether great quantities of sulphur may not be obtained from them. There is a bituminous spring in Alleghany county, whence the famous Seneka oil is obtained. In Purchas' Pilgrims, it is stated, that "near unto Buchan in Persia is a very strange and wonderful fountain under ground, out of which there springeth and issueth a marvellous quantity of black oil, which serveth all parts of Persia to burn in their houses."* It is also used in that country for lighting streets, and in its purest forms is called Naptha. At Amiano, in Italy, the petroleum of a spring, discovered within a few years, is also employed to light their cities. It might be of considerable consequence to discover whether the petroleum of our springs might not be used for like beneficial purposes.(10)

"Homo naturæ minister et interpres." Man is the minister and interpreter of nature, said a great philosopher;† and he ought unquestionably to commence the study of the important science of nature by becoming acquainted with his own species in every form of existence, and in every stage of society from the erratic savage of the forest to the polished inhabitant of the city. In this country we behold man in every shape and modification, of insulated and social being. When we peruse Herodotus' description of the scythians; Thucydides' of the ancient grecians; Cæsar's of the gauls and britons; and Tacitus' of the germans, we perceive the prototypes of our indians: but we have it in our power to view man in a savage state with our own eyes, without relying upon the reports of others; and it is to be regretted that so much time has transpired without more attention being bestowed on this interesting subject. Dr. Robertson says, "almost two centuries elapsed after the discovery of America before the manners of its inhabitants attracted, in any considerable degree, the attention of philosophers." This neglect can, perhaps, never be fully retrieved. An intercourse with civilized man has changed our indians in almost every respect; but there is still a sufficient remnant of their manners, languages, and traditions left to interest inquiry and invite investigation: in some very remote quarters they may still be found in the unsophisticated forms of original barbarism; unaltered by extrinsic intercourse. Many of their languages may still be redeemed from oblivion, their persons may be delineated, and their manners and traditions may be described; and the knowledge which may be obtained, added to what has already been collected, may furnish invaluable illustrations of the human species.(11) The number of languages in Mexico is thirty-five, of which fourteen have grammars and dictionaries. The Bible has been translated by Elliot, the indian apostle, into the algonquin language: two thousand copies of the Mohawk version of St. John's gospel have

* Purchas' Pilgrims, vol. 2. p. 1431.

† Clavigero's Mexico, vol. 2.

† Bacon's Novum Organum.

been lately printed by the British and Foreign Bible Society; and we have many and considerable collections of words in different indian languages. Our antiquities are of two kinds, such as relate to the aboriginal, and colonial states. We have no indian monuments or curiosities that can be compared with the forts on the Ohio, or with the temples of the Aztecs. There are some remains of indian pottery, (12) of weapons, and of rude paintings. Mounds of earth, like the tumuli in Scandinavia, Russia and Tartary, the barrows in England, and the cairns in Scotland and Ireland, may still be seen; and also the outlines of extensive fortifications. But the variegated condition of the white man here exhibits human nature in all its shapes: we behold him in every stage of society from the semi-savage hunter, to a polished citizen; and we perceive every stage of cultivation from the first tree that was cut to the elegant habitation. "In North America," says a distinguished writer, "a traveller who sets out from a great town, where the social state has attained to perfection, traverses successively all degrees of civilization and industry, which keep diminishing till he arrives in a few days at the rude and unseemly hut formed of the trunks of trees newly cut down. Such a journey is a sort of practical analysis of the origin of nations and states.—— We set out from the most complicated union to arrive at the most simple elements. We travel in retrogression the history of the progress of the human mind, and we find in space what is due only to the succession of time."*

Zoölogy has been greatly neglected. Lionæus has distributed animals into six classes; and has arranged the mammalia consisting of viviparous animals which suckle their offspring, into seven orders; according to the position and peculiarity of their teeth. (13) This arrangement, which places man in the same order with apes, monkeys and bats, has been rejected by eminent zoölogists. Some have distinguished animals by the hoofs and toes, and others by the structure of the heart. The want of a regular and established system has created confusion in this science, and has added to the difficulties of those europeans who have attempted to describe our animals. There has not been written in this country, any professed work on its quadrupeds; and those sketches which have been published are greatly deficient, especially in omitting to notice at large the habitudes and manners of animals; the most interesting part of natural history. A writer devoting himself to the elucidation of our quadrupeds alone, and confining his view to this state, would have subjects of vast interest and moment. He would undoubtedly place at the head of his list, the mammoth, or *elephas americanus*; skeletons of which have been discovered in Orange and Ulster counties and one has been put up in Peale's Museum. He would elicit all the information that could be obtained from this source: he would examine the different hypotheses which have been suggested in relation to this animal, and he would not

* Talleyrand on Colonization.

even overlook the traditions of the indians ; he would determine whether it was herbivorous, or carnivorous ; whether it was the hippopotamus, the rhinoceros, the common elephant, a monster of the ocean, or a distinct race of animals ; and he would avail himself of the knowledge which is to be derived from the russian discoveries. (14)

He would then describe the white brown or grizzly bear ; the ferocious tyrant of the american woods ; and would show that it is a nondescript, and a distinct animal from the *ursos aretos*,* or polar bear ; with which it is confounded. He would state the effects that the settlement of the whites, and particularly the terror which accompanies the gun, have had upon wild animals ; driving them into the boundless regions of the northwest, and over the waters of the Mississippi : that the grizzly bear formerly resided in this state, according to the traditions of the Delaware and Mohican indians, who say that the last was seen on the east side of Hudson's river ; and they to this day terrify their children with it ; that the claw of the unknown animal which was discovered in a cave in Virginia, and which mr. Jefferson calls the *Megalonyx*, was probably the claw of this animal : who has retreated from the eastern parts of the continent, and occupies that wide and extensive range of country upon all the waters which form the sources of the Missouri ; where he exists the terror of the savages, and the tyrant of all other animals : devouring alike man and beast, and defying the attacks of whole tribes of indians. (15)

These descriptions might be increased in interest by referring to the time when the buffalo, which now occupies the prairies of Louisiana in herds sometimes of fifty thousand, inhabited this state. This animal is supposed, by Pennant to be the *bonasus*, *urus*, or bison of the ancients and the stock from whence our domestic cattle is derived ; although Buffon is of a different opinion. He must be carefully distinguished from the *bos Indicus*, or buffalo of India, which is a distinct race and is in a domestic state in Italy and some other parts of Europe. The american buffalo has also been tamed in a few instances ; and both these animals may be rendered highly useful in husbandry. (16) The moose and the elk have been confounded together by european naturalists, whereas they are radically distinct. (17) The former is confined to America, is never seen south of the forty-fourth degree of north latitude, and his range is limited to about ten degrees of latitude and fewer of longitude : he may probably grow to the height of twenty hands. There is reason to apprehend the total extinction of these animals, as they herd in droves of eighteen or twenty in winter and return to the same spot at night ; and, when the snow is deep and encrusted, suffer themselves to be killed without moving from the place they have trampled. It is now time, therefore,

* *Ursos aretos*. The Liuguan name of that animal is *ursus maritimus* ; of the common bear of Europe, *ursus arctos* ; and of the common bear of America, *ursus americanus*. The grizzly bear has no scientific name.

to have an accurate account of this animal, which may still be found in northern parts of the state; and the idea was so forcibly impressed upon the mind of a learned emigrant,* that in an address to an Agricultural Society in Whitestown, in 1795, he proposed premiums for certain dissertations; and among others, "for the best anatomical and historical account of the moose, fifty dollars; or for bringing one in alive, sixty dollars." The moose, as well as the elk, may be reclaimed from its wild state. The latter is not so tall as the former and, perhaps, never exceeds fifteen hands; and he generally inhabits milder climates. The reindeer has also in former times, in all probability, extended his travels to this state from the regions of the north; his favorite food, the lichen *rangiferinus*, is to be found in our mountains. Our tiger, or panther, the *felis concolor* of Schreber, and the cougar of Buffon, is the same animal called the puma or lion of South America where he is extremely ferocious; the mildness of our climate having rendered him a less dangerous animal. The beaver in his state of habitation, may still be found in the remote parts of the state. The names of many creek and rivers, and places denote the former residence of animals which have long since abandoned them; but it would engross too much time to pursue these hints. I cannot, however, close them without remarking that this branch of zoölogy affords abundant room for original inquiry and description.

Many meritorious attempts have been made to illustrate the ornithology of America. Mr. Alexander Wilson, whose death is to be sincerely lamented by every friend of science, had devoted himself for years to this subject with an enthusiasm, industry, and ability never surpassed. The exactness of his likeness, the fidelity of his descriptions, his interesting representations of the manners of birds, and the talents for observation and delineation which are displayed in every part of his elaborate work, justly place it in the first rank of writings on natural history. Although he has done so much, yet the subject is by no means exhausted. (18) There are doubts on many points, which one would think ought long since to have been settled. (19) But the most interesting part of ornithology is the migration of birds. There are some that stay with us the whole year; there are others that visit us regularly; and there are several that visit us occasionally, or accidentally; which are driven by storms on our coast, by famine from their usual country, by excessive heat from the south, or excessive cold from the north; or by some cause unknown to us. All these birds ought to be carefully noted, and accurately distinguished. Strange birds are frequently seen in the vicinity of the ocean after a storm. Several years ago a large flock of paroquets was observed twenty-five miles to the northwest of Albany. I am credibly informed that the last ravages of the canker worm on the west side of Long Island were arrested by a strange bird (called by the farmers the canker-worm-bird) never seen before nor since, and which devoured that destructive vermin with great voracity. There are birds that some-

* F. Adrian Vanderkemp.

times stay with us the whole year, and at other times depart : this depends upon the mildness of the weather, and the quantity of food. With the ancients, husbandry was regulated by the appearance of particular birds ; and calendars of Flora have been kept in different parts of Europe, embracing this and other objects which are calculated to be highly useful. I do not know that any calendar of this kind has been made in this state ; but any person possessed of any talent for observation might easily compile one ; which, in order to be complete, ought to contain an account of the leafing and flowering of plants and trees, the progress of vegetation, the departure and return of birds, and correct meteorological observations.

When on this subject it may not be amiss to draw your attention to a very striking difference between the country east and west of the Alleghany Mountains in this state, which is to be observed very distinctly in relation to birds, plants, and quadrupeds, and which formerly applied to the aborigines. At the first settlement by europeans, the indian population was greater on the west than on the east side of the mountains. I have seen that beautiful bird, the *loxia cardinalis*, in our western country ; and I believe it never appears here : there are other birds that follow the cultivation of the country from the east : this is the case with the crow ; (20) in some of the western parts of our country he is not to be observed ; the raven supplies his place : and it is conjectured that several of the migrating birds come up on our side of the mountains and return on the west. There are several trees and plants in that part of the state which do not grow in this. There seem to be two races of squirrels : in the west they are black, in the east they are gray ; and while many wild animals have left us, the great hare of the north is extending his excursions in a southern direction. (21)

On the approach of cold weather the birds, as if actuated by an intelligent principle, prepare for their departure. Some of them retire in the night, or ascend so high that their flight is not observed ; while others appear in full view and attract not only the notice of the naturalist, but become the subject of poetical description.

Milton thus speaks of the migration of cranes :

“ Part loosely wing the region, part more wise
In common, ranged in figure wedge their way,
Intelligent of seasons, and set forth
Their airy caravan, high over seas
Flying and over lands, with mutual wing
Easing their flight : so steers the prudent crane
Her annual voyage, borne on winds ; the air
Floats as they pass, fann'd with unnumber'd plumes.”

PARADISE LOST.

And Tasso, in like manner, says,

With such a sound the cranes embodied fly
From thracian shores to seek a warmer sky,

With noise they cut the clouds, and leave behind
The wintry tempest and the freezing wind."

Tasso, v. 2. b. 20.(22)

The secret departure of many species of birds has introduced much fable into ornithology. It is time that the submersion of swallows, and the fascination of serpents, should be banished from our natural, and the welsh nations of indians from our civil, history. In the midst of winter, when occasional mild weather occurs, birds that were supposed to have left the country suddenly reappear. This has induced a belief that many of them remain in a torpid state during the winter, in the fissures of rocks, or in hollow trees; all these indications ought to be carefully watched. Buffon says, that of three hundred species of quadrupeds, and one thousand five hundred of birds, man has selected but nineteen or twenty; and that only nine species of birds have been domesticated. He is greatly mistaken in the number of species, although he is nearly right in other respects.(23) The list of useful-domestic birds may be greatly increased. The Canada goose and the turkey, it is believed, have been added by America: the black duck, brant, wood duck, and prairie hen, have, in many instances, been tamed; and why might not teal and grouse be also domesticated? Our stock of domestic fowl might also be increased by the peruvian hen and the hoco or curasso of South America; which is about the size of a turkey; the flesh of both is much esteemed; and why might not our useful wild birds be augmented by importing from Europe the red-legged partridge, and the pheasant: it is supposed that pheasants were brought into Europe by the Argonauts, one thousand two hundred and fifty years before the christian era, from the banks of the Phasis a river in Colchis in Asia Minor.(24)

Our ichthyology has received little attention. Dr. Mitchill, to whom science is greatly indebted, has recently published a small work on the fishes of New-York, and it is to be hoped that he will continue his useful labours.(25) The migration of fishes is as curious an object of inquiry as that of birds. The anadromous fish affords, particularly, great scope for observation. It is true that while the herrings ascend on one side of the Hudson above Albany, that the shad proceed on the other?(26) Our great lakes, and the streams which run into them, present a wide field for remark: it is worthy of notice that there are in the lakes fishes corresponding in appearance with those in the sea: the sheep's head, the sturgeon, and the bass, may be mentioned as instances. It has been judged very difficult to discover how sturgeon get into Lake Erie, on account of the Falls of Niagara; and it is said that a french governor had some conveyed into it from Lake Ontario; but it is very easy to account for it in another way: the Illinois river frequently communicates, in spring and autumn, with the Chicago creek which discharges itself into Lake Michigan.(27)

The production and migration of eels have puzzled naturalists. The

laws which govern this fish are peculiar : the eel goes to the sea for production, and the young ones attain their growth and maturity in fresh water.

The mildams and other artificial obstacles in rivers against the ascent of anadromous fishes have, in some places, entirely expelled them ; and in others diminished their number. The salmon, if we may credit the account of Hudson's voyage, formerly visited this river : he is now an entire stranger, and he is retiring very rapidly from the Connecticut river and from several streams that flow into the western lakes.(28) The disappearance of fish for years, as for instance the lobster during the revolutionary war, and sometimes the visits of strange fish, are circumstances deserving of observation. The best mode of multiplying and preserving shellfish would be a subject useful to investigate ; and why might we not increase our fresh-water fish by importing the carp and tench for propagation, as was formerly done in Great Britain ?(29)

The Linnæan classes of amphibia, vermes, and insects, have been almost entirely overlooked ; and yet what an immense field for inquiry do they present ? There are, it is estimated, twenty thousand species of insects ; twenty species feed on the apple tree alone, seventeen of which are phalænas (millers.) There are seventy-five species of the aphis, (plant louse,) so destructive to vegetation. The ravages of the weevil, hessian fly, canker worm, palmer worm, grass worm, and rose bug, are incalculably injurious. Dr. Barton has intimated that several of our animals supposed to be indigenous may be of european origin.(30) Be this as it may ; we know that noxious insects of native origin, migrate from native to naturalized vegetables as they furnish more abundant or agreeable food. Different preventives and remedies have been prescribed for their depredations, but it still remains to discover effectual ones. Silk worms are cultivated with great success in some parts of the country, and excellent silk is made. It has been disputed whether the *apis mellifica*, or honey bee, has not been imported into America ? Jefferson and Barton say it has ; Belknap has taken opposite ground. One would suppose that Cortez had settled this question in his letters to the emperor Charles V., which describe all the commodities vended in the great market of Mexico, where, he says, " There is sold honey of bees and wax : honey from the stalks of maize which are as sweet as sugar, and honey from a shrub called by the people *maguey*." Lewis and Clarke, in their journey to the Pacific Ocean, did not observe the honey bee after they left the Osage indians.(31)

Our ophiology is, of course, of a very limited range. We have between thirty and forty species of serpents ; the most remarkable one, the rattlesnake, *crotalus horridus*, not being able to exist in the vicinity of swine, has fled from the cultivated country. Is it true, that on apprehension of danger, the young retreat into the mouth of the mother for safety ?(32)

But it is time to stop these intimations, already too desultory and minute; and we shall make a few general observations which are intimately connected with the flourishing condition of natural knowledge.

1. The establishment and encouragement of cabinets of natural history are essential to the promotion of this interesting science. Scudder's Museum in this city and Peale's in Philadelphia, are invaluable institutions deserving private and public patronage.

2. Statistical inquiries ought to be prepared and circulated in every town; eliciting information on every subject connected with the natural history, geography, agriculture, commerce, and manufactures of the state. An excellent specimen of statistical questions may be seen in the Transactions of the Academy of Arts and Sciences of Connecticut. Dr. Dwight's account of New-Haven is a model for writers, on this interesting branch of knowledge, to imitate.

3. Inquiries ought to be prepared and transmitted to different parts of the world, with a view of obtaining intelligence on all important subjects relative to science and literature. Specimens of this mode of accumulating useful facts may be found in the Transactions of the Royal Society of London: That learned body adopted this plan at their first establishment. Our Agricultural Society, in 1793, proposed to the chamber of commerce that standing instructions should be given by the merchants to the captains of vessels sailing to Africa, Asia, and the north of Europe, and the southern and western parts of America, to collect information respecting husbandry; and the chamber of commerce recommended the measure; but it is believed that no beneficial result has accrued.

4. Men of observation and science ought to be employed to explore our country with a view to its geology, mineralogy, botany, zoölogy, and agriculture. They ought not only to examine with their own eyes, but to avail themselves of local information to be derived from intelligent men in every part of the state. By these means a mass of valuable and authentic information may be obtained which can, in most cases, be acquired in no other way.

The celebrated Linnæus often expressed a wish to visit America, in order to explore its vegetable productions. His disciple, Kalm, travelled through this country in 1748, for that purpose. Since the revolutionary war several European princes have sent scientific men here to make collections and observations on our natural history. The Michaux, father and son, have thrown great light upon our botany by their inestimable labours. The elder of them published a treatise on the oaks of America, wherein he describes twenty-nine species and varieties: the younger, who, with much ability, edited and published, in 1803, the *Flora Boreali Americana*, chiefly the result of his father's investigations, has also lately completed, at Paris, the *Histoire des Arbres Forestiers de L'Amerique Septentrionale*, in three volumes. In this work F. Andre Michaux has considered our forest trees more particularly as subservient to commerce and the arts. The respective performances of these distinguished and

enterprising botanists, may justly be considered as among the most important contributions which the natural history of North America has received. The Botanical garden established in the vicinity of this city by dr. Hosack, contains seven hundred and thirty-three genera, and two thousand four hundred species of plants : it was purchased by the state in 1810, and recently presented to Columbia college : it is to be hoped that this valuable institution will prosper under its new proprietors, and that a professorship of botany will be connected with it. Dr. Muhlenburg of Lancaster, an eminent botanist, has lately published an account of the native and naturalized plants of America, according to the Linnæan system ; which includes eight hundred and sixty-three genera, and their corresponding species.

It has already become difficult to discriminate between our native and naturalized plants ; with the progress of time the difficulty will increase, and it ought to be removed as soon as possible. From the vegetable kingdom man derives his principal food and medicine, and it administers to his wants and luxury in a variety of shapes. The botanist ought to attend to the substitution of indigenous medicines, of equal efficacy, to those imported ; and also to the discovery of others whose qualities are now unknown, as applicable to the cure of diseases : he ought also to direct his attention to the discovery of indigenous esculents ; and of articles for dying, soap, lights, and other branches of domestic economy. America has furnished maize, or Indian corn, which may be compared with the best of the cereal gramina of the old world ; she has also originated the potato, which has administered more to human subsistence than any other production whatever. There are probably other undiscovered legumens and gramina which may essentially contribute to the comfort and support of mankind. It is said that there is a natural meadow of vast extent in the Michigan Territory, which abounds with wild potatoes and artichokes ; it would certainly be worth while to ascertain whether they are the real *solanum tuberosum*, and *helianthus tuberosus*.(32) All the indians of the northwest have, according to Pike, a species of wild oats for their only farinaceous food : we would rather suppose it to be a species of rice, as it is an aquatic plant ; and if each stalk produces, as it is stated, half a pint of grain, it is undoubtedly an object deserving of attention.(33) Lewis and Clarke have pointed out several vegetables unknown to us, which the indians use. These and many other sources of inquiry are open to us. XThe discovery of a new plant gives celebrity to a botanist ; and, if useful to mankind, his fame is immeasurably enlarged. /Before I conclude this subject, permit me to inquire whether the *cypripedium bulbosum* has ever been seen in this country ? I ask this question, because Acerbi, in his Travels, has made the following observations respecting it :

“ To mr. Custien science is indebted for the discovery of a fa-
E.

mous plant, viz. *cypridium bulbosum*, which was at first seen by Rudbeck in 1685, but had never been found since by any botanist; not even by the great Linnæus, who passed this way in July, and, consequently a month after it had been in flower. This plant skulks among the underwoods and firs which surround the church of Kemi. It modestly eludes the prying eyes of the passenger, and loves the temperate enjoyment of the sun's rays, which can only reach it by insinuating themselves between the branches of the bushes that overshadow it. Dr. Smith, president of the Linnæan Society, has given us a coloured figure of it extremely accurate and lively, which the reader may see and admire in his collection of rare plants. This is one of the rarest as well as most beautiful productions of the north: it is indigenous in the parish of Kemi. Hitherto it has been discovered nowhere else except, as I have been informed in North America."*

Adequate and satisfactory notices of our husbandry would occupy too much time. Our attention ought to be drawn to supplies of the best and most powerful manures. As gypsum has no influence in the atmosphere of the sea, it is a great desideratum to find a substitute equally efficient for the Atlantic parts of the state. Fish, peat, sea-weed, street dirt, calcined pyrites, lime, ashes, and marl, have been all recommended; and some of them have been tried with great success. The dyking of salt meadows and marshes, and thereby creating excellent land for tillage and grass, and the irrigation of lands, would be very advantageous; and they have not been practised with us except in a few solitary cases. Several plans for a rotation of crops have been proposed, but have not been attended to in a manner due to their importance. The failure of wood not only requires some beneficial system for replenishing our forests, but for accommodating the farmer with substantial fences: hedges of whitethorn or hawthorn may answer a valuable purpose; and it is believed that there are three species with us; two native and one imported from Great Britain. Of all the culmiferous plants, wheat contains the heaviest grain, and it is certainly the most important of the cerealia; it is our great staple commodity; and the utmost care ought to be taken in perfecting and protecting it against the injuries which it receives from various sources. The selection of the best kind for seed is a great object, there being several species; red, white, yellow, bald, bearded, summer, and winter. It is obnoxious to injury from cockle, drips, sorrel, commixture of rye, smut, the weevil, the hessian fly, blast, and mildew. The cause of mildew is unknown; the blast sometimes arises from the effluvia of barbary bushes, but generally from the rapid growth of the grain in June. The origin of the hessian fly, and the best remedy against its depredations, are subjects about which there is a contrariety of opinion. (34) Particular attention ought also to be devoted to the selection of the best grasses. Lucern, sainfoin, esparcet, and

* Accebi's Travels through Sweden, &c. vol. 1. p. 340.

pimpernel, foreign and perennial grasses, have been mentioned as highly useful. Red clover and timothy are also exotics; but white clover is a native plant, and invariably follows cultivation. The *avena elatior*, or tall meadow oats, was imported some years ago into Pennsylvania by Dr. Muhlenburg; and is recommended as the best grass for green fodder and hay. The *festuca ovina*, or sheep's fescue, is preferred in Sweden to all others for sheep: Gmelin says, that the tartars fix their tents during the summer in those places where there is the greatest plenty of this grass, and that the sepulchral monuments of the ancient tartars are mostly found where it abounds; which shows that it has been long valued by them. Stillingfleet says that it is found in abundance in many parts of England and Wales. In the *Hortus Elginensis*, published by a distinguished botanist,* it is mentioned as being in that establishment; and as a hardy perennial plant: it is a vernal grass, and not a native of this country: I have mentioned it thus particularly because it is so important a nutriment to sheep, of which it is believed we have nearly two millions in this state. Wonderful qualities are ascribed to the Guinea grass in Jamaica, and the florin† is highly commended as surpassing all the grasses in its nutritious powers. (35) In selecting the best foreign grasses for cultivation, we ought not to be unmindful of those which nature has provided us at home. In the western parts of this state there are several native grasses deserving of attention. One kind, called the winter grass, resists the effects of frost; and when the snow leaves the ground in the spring, furnishes nourishing pasture. Another species is stated to resist a dry season, and to be in full verdure when all other plants are perishing with drought. A perennial plant, called the wild pea, is said to be superior to clover as fodder; to which it is not only preferred as nourishment, but it has this advantage; that the stock is not so brittle, nor are the leaves so apt to pulverise. There is a highly aromatic plant, collected by the indians in small quantities, called the Seneca grass,‡ (35) When on this subject it is proper to state, that there are certain plants which are pernicious to some kinds of cattle and not to others; for instance, the meadow-sweet § wastes away the cow but is beneficial to the goat: the long-leaved water hemlock will destroy a cow, whereas the goat browses on it greedily; monk's hood kills the goat, but will not hurt a horse; the andromeda, or dwarf laurel, is very fatal to sheep; and so is the *kalmia latifolia*, which is devoured with avidity by deer.

Greater attention ought to be paid to the cultivation of our fruit; and to the destruction of those noxious insects and worms which have, within a few years, injured it beyond measure. Our soil and climate are admirably adapted for some of the most delicious fruits. The Spitzbergen apple is said to have been discovered accidentally in the vicinity of Al-

* Dr. Hosack. † *Agrostis Stolonifera*. ‡ *Holcus Fragrans*. § *Spiraea Ulmaria*.

bany ; and it is only rivalled by the Newtown pippin, whose excellence is also, probably, of local origin and which reminds us of the *malum aureum* of the ancients. We ought, also, to be particularly attentive to the introduction and naturalization of the best foreign fruits ; and the importance of this will be duly appreciated when we consider the origin of those which are now most esteemed. The cherry and filbert are from Pontus ; the apricot from Epire : the peach from Persia : the citron from Media ; the pomegranate from Carthage ; the quince from Cathonea ; the plum from Damascus ; the best pears from Alexandria ; and the olive and fig from Greece.(36)

It would certainly not become me to point out the desiderata in medical knowledge. This country was never blessed with a more splendid list of medical names, than those which now occupy the walks of this profession ; but I will surely be indulged in soliciting their attention to two subjects intimately connected with the public health, and the happiness of thousands.

The consumption is the most destructive disease in the northern states. One ninth of the deaths in New-Haven are occasioned by it. According to the bills of mortality of 1813, out of seven hundred and eighty-six deaths in Boston, one hundred and ninety-three were caused by the consumption ; out of two thousand two hundred and ninety-one deaths in Philadelphia, two hundred and sixteen ; and out of two thousand two hundred and ninety-nine deaths in New-York, five hundred and sixty-two. Is there no way of preventing or curing this disease ? must those labouring under pulmonary complaints be invariably driven to southern climes for relief ? the physician who discovers an efficacious remedy for this terrible malady will have his name enrolled among the benefactors of the human race : it now exists the opprobrium medicorum ; and sweeps into the grave, with unsparing fury, genius youth, and beauty ;—all that can adorn, embellish, and illuminate society. (37)

Who does not recollect the terror and mortality which invariably accompany that horrible pestilence denominated the yellow fever ? Under its iron reign we see persons fleeing from their homes in all directions, the insignia of death in every street, and the grave continually open to receive its miserable victims.

In this awful hour,

—————"Mussabat tacito medicina timore."

—————"In silence dread,
Appall'd and doubtful, mused the healing art."
LUCRETIVS.

And yet what clouds and darkness rest over the origin, nature, and cure of this pestilence. Whether it comes to us from abroad, or origi-

nates at home? whether it is contagious or not? are questions solemnly debated by the profession, and treatises of much learning and ingenuity have been written on both sides. (38) It is stated by Humboldt that a plague, called the *matlazahuatl*, prevails about once in a century among the indian race in Mexico; that in 1545 eight hundred thousand died of it; and in 1576 two millions; and that it never attacks white people. Can this be the disease which swept off whole nations of our northern indians before the european settlement of this country? and if it be true that the yellow fever, as is alleged, seldom if ever attacks the mexican indians here is a very extraordinary field open for investigation.

It would be a gigantic work to point out those subjects of investigation applicable to political science, and which demand attention from their peculiar application to this country or from their general importance. Let me glance at a few. How far a representative government upon the federal principle may be extended; the extent of judicial independence; the arrangement of the elective franchise; the constitution of the executive power; the establishment of a veto, or qualified negative; the institution of an executive council; the organization of the appointing power; and the constitutional rotation of office. If we are astonished to find these principles in government so unsettled and so much afloat, we are equally surprised to learn that the very elements of political economy are still unknown or controverted. There is, in fact, much abstruse investigation, and much metaphysical subtlety in this science; and, perhaps, more terra incognita than in any other of equal importance. A mere hint at a few points will sufficiently illustrate this proposition.

The following among others, are still subjects of speculation and controversy: what is national wealth? the means of producing it? the influence or action of the generating causes? their immediate or distant effects? their apparent or actual results? the different ramifications of the sources of wealth; such as labour, capital, the circulation of commodities or commerce? and the revenue or consumption? the source of wealth; whether in labour, foreign commerce, land, or capital stock? in what capital consists? the nature of money? the proportion which the circulating money of a country bears to the whole value of the annual produce circulated by it? whether labour is the standard of value, and whether there is an immutable standard measure of value? whether agricultural labour is exclusively productive or most productive? and perhaps the most controverted subject of political economy is, whether the home or foreign commerce is most productive of national wealth.

I am persuaded that sufficient has been said to show that this institution embraces the most important objects of investigation; deeply, intimately, essentially, and extensively connected with the best interests of science, the prosperity of our country, and the dignity of man.

It now remains that we should perform faithfully, what we have undertaken voluntarily. The harvest is great, and the labourers are few. The cultivation of knowledge, like the cultivation of virtue, is its own reward.

"Speak ye the pure delight, whose favour'd steps
The lamp of science through the jealous mase
Of nature guides, when haply you reveal
Her secret honours, whether in the sky,
The beauteous laws of light, the central powers,
That wheel the pensile planets round the year,
Whether in wonders of the rolling deep,
Or the rich fruits of all-sustaining earth,
Or fine-adjusted springs of life and sense,
Ye scan the counsels of their author's hand."

PLEASURES OF IMAGINATION, b. 2.

History and observation justify the remark that while the movements of conquest have been from the north to the south, and the course of the precious metals from the west to the east ; that the progress of the ocean and of the atmosphere, of the arts and sciences, and of the civilization of the human species, has been from the rising to the setting sun : and, according to the uniform experience of mankind, we have every reason to believe that our country will be the chosen seat, and favourite abode, of learning and science. May this association be a humble instrument in paving the way for this sublime result ; and may posterity describe its origin, its progress, and its maturity, by adopting, with a small variation, the language of the roman bard :

"Mobilitate viget, viresque acquirit eundo :
Parva metu primo ; mox sese attollit in auras,
Ingrediturque solo, et caput inter nubila condit."

ÆNEID, lib. iv.

It grew strong by exertion, and acquired strength in its progress : small at first, through diffidence, it soon sprung up into the sky, spread over the earth, and hid its towering head in the heavens.

NOTES

AND

ILLUSTRATIONS.

NOTE 1.

I have scarcely thought it worth while to refer to the book of M. De Paw, a prussian, wherein he has copied the calumnies of Buffon against America, with additions and embellishments. This work, which was published in three volumes, has been amply refuted by don Pernety, and the abbe Clavigero.— As a specimen of his accuracy it is sufficient to state, that he confidently asserts that dogs suffer so much under the deteriorating influence of our climate, that they lose the power of barking, and that all the plants of Europe have degenerated in America, except those which are aquatic and succulent.

If any person is desirous of seeing the essence of all the slanders against the United States, invented and propagated by ignorant and insignificant tourists, let him look at the eleventh article of the twentieth number of the London Quarterly Review; purporting to be a review of Inchiquin the Jesuit's Letters; but, in fact, an impotent effusion of malignity against our country, its morals, manners, intellect, and institutions. This diatribe is attributed to the pen of Southey the poet, and its whole force depends upon the liberal use of that commonplace sophism termed a false induction. From a few particulars, disparaging to the country, he has inferred a general conclusion to its disadvantage: upon the faults of the few he predicates the vices of the many. Applying the same rule of judgment to himself, it would be easy to prove him the most wretched poetaster in Europe. If we look into his poems we will find, among some splendid effusions of genius, the most miserable conceits; and if, upon the selection of those offences against taste and good writing, we were to pronounce his poetical character, who would not condemn our candour as well as our logic?

This tissue of falsehood and scurrilous invective, states, that general Washington was in favour of a monarchy; that mr. Jefferson exercised a pernicious influence over mr. Adams: that Franklin was but a small philosopher; that Rittenhouse was an englishman; that no such character as a respectable country gentleman is known in America; that it is impossible to bring a thief to justice, &c. These violations of truth were selected; as we casually cast our eyes over this review, and they are brought forward as specimens of the whole performance. The authorities to which the writer has appealed for his slander are some newspapers, the Works of William Cobbett, and the Travels of Jansen, Priest, Ashe, Wansey, Weld, Lambert, and Parkinson. Scarcely one of these had any pretensions to literature. Ashe, if such a person ever existed, was, in all probability, never in this country; Priest came over as a musical adventurer; of Parkinson we may say, in the words of Congreve, "Ferdinand Mendez Pinto was but a type of thee, thou liar of the first magnitude." The others, under a more decent garb, are equally regardless of truth. The character of Cobbett is known in Europe, as well as in this country: if we are desirous of attaining truth we must reverse his assertions. Jansen published his book in a quarto form in London, in 1807, under the title of "The Stranger in America, by Charles William Jansen, late of the State of Rhode Island, Counsellor at Law:" but we learn, from good authority, that he was a barber in that state. It abounds with offences against truth and considering his long residence in the United States, exhibits a great dearth of information, and a great want of intelligence: take, for example, an extract from the first page I have opened: "Soon after mr. Jefferson's advancement to the presidency, the tithes of the episcopal clergy were entirely abolished, and the church lands sold for the use of government; all religious sects are, therefore, on the same footing without the supremacy or limited salaries."

As a conspicuous example of the reviewer's total disregard of candour and justice, I might refer particularly to his unworthy attack upon messrs. Emmet, Sampson, and M'Nevin; whose genius, learning, and virtues, would reflect honour on any country.

NOTE 2.

Governor Burnet was a man of extensive reading and information. He wrote a commentary on the Apocalypse, and made many useful astronomical observations. Swift's Discourse on the Mechanical Operation of the Spirit was supposed to be addressed to governor Hunter. In the fifteenth volume of Swift's Works there are two letters from the dean to him. In the first epistle Swift says, "Sometimes mr. Addison and I steal to a pint of bad wine, and wish for

no third person but you ; who, if you were with us, would never be satisfied without three more." In the second letter he says, " I am very much obliged to you for the favour of a kind reproach you sent me in a letter to Mr. Addison, which he never told me of till this day, and that accidentally ; but I am glad at the same time that I did not deserve it, having sent you a long letter in return to that you was pleased to honour me with, and it is a pity it should be lost ; for, as I remember, it was full of the *dei fabulas*, and such particularities as usually do not find place in newspapers." These quotations indicate the great intimacy between Hunter and those distinguished men.

The same volume contains two letters from Hunter to Swift, dated New-York 1st and 14th of March, 1712-13, both breathing great discontent and uneasiness with his situation. In the last he says, " Here is the finest air to live upon in the universe, and, if our trees and birds could speak and our assemblymen be silent, the finest conversation too. *Fert omnia tellus* ; but not for me ; for you must understand, according to the custom of our country, the sachems are of the poorest of the people. I have got the wrong side of *sir Polidore's* office ; a great deal to do, and nothing to receive. In a word, and to be serious at last, I have spent three years of life in such torment and vexation that nothing in life can ever make amends for it."

Hunter was afterwards appointed governor and captain general of Jamaica, in the room of the duke of Portland, who died there in 1726.

NOTE 3.

The first institution in the United States established as a repository of the native vegetable productions of this country, and for the purpose of naturalizing such foreign plants as are distinguished by their utility either in medicine, agriculture, or the arts, was the Elgin Botanic Garden, founded in 1801, by Dr. David Hosack, at that time Professor of Botany and *Materia Medica* in Columbia College. This establishment is situated about three miles from the city of New-York, on the middle road between Bloomingdale and Kingsbridge. The ground, consisting of about twenty acres, was originally purchased of the corporation of this city. The view, from the most elevated, part is variegated and extensive ; and the soil itself of that diversified nature as to be particularly adapted to the cultivation of a great variety of vegetable productions.

Speaking of the particular situation of the Botanic Garden of this state, a British writer, in the London Medical and Physical Journal, among other remarks, has the following :

"No region of the earth seems more appropriate to the improvement of botany, by the collecting and cultivating of plants, than that where the Elgin Botanic Garden is seated. Nearly midway between the northern and southern extremities of the vast American continent, and not more than forty degrees to the north of the equator, it commands resources of incalculable extent ; and the European botanist will look to it for additions to his catalogue, of the highest interest. The indigenous botany of America possesses most important qualities ; and to that, we trust, professor Hosack, the projector, and, indeed, the creator, of this garden, will particularly turn his attention. It can hardly be considered as an act of the imagination, so far does what has already been discovered countenance the most sanguine expectations, to conjecture, that in the unexplored wilderness of mountain, forest, and marsh, which composes so much of the western world, lie hidden plants of extraordinary forms and potent qualities."

Soon after the purchase, the proprietor, at a very considerable expense, had the ground cleared and put in a state of cultivation, arranged in a manner the best adapted to the different kinds of vegetables, and planted agreeably to the most approved style of ornamental gardening. A conservatory for the preservation of the more hardy greenhouse plants was also built. At the commencement of 1805 nearly fifteen hundred species of American plants, beside a considerable number of rare and valuable exotics, were in cultivation in this institution. In 1806 very important additions were made to this collection of plants from various parts of Europe, as well as from the East and West Indies. A second building for their preservation was also erected, and the foundation of a third was laid, which was completed in the following year. In the autumn of the same year, 1806, a catalogue of the plants, both native and exotic which had been already collected, and which amounted to nearly two thousand, was published. Since that time the Botanic Garden has been greatly improved. The buildings, which are erected on the most recent plan adopted in institutions of this kind, consist of three large and well-constructed houses, exhibiting a front of one hundred and eighty feet. The greater part of the ground is brought in a state of the highest cultivation, and divided into various compartments, calculated for the instruction of the student of botany and medicine, and made subservient to agriculture and the arts. A greater part of the establishment is surrounded by a belt of forest trees and shrubs, and these again are enclosed by a stone wall two and a half feet in thickness, and seven feet in height.

The expense requisite to effect these several purposes far exceeding the calculations the proprietor had originally formed, and being desirous of perpetuating the institution, he was induced to offer the whole establishment for sale to the state. An almost entire unanimity prevailing among the medical faculty relative to the advantage to be derived from an institution of the kind, as highly necessary to complete a system of medical instruction, and similar sentiments being entertained by many others who felt an interest in the literary reputation of the state, application was made to the legislature that provision might be obtained for the purchase of the Botanic Garden. On this occasion memorials were presented by the state medical society, the medical society of the city and county of New-York, and of the counties of Dutchess, Ulster, Niagara, Saratoga, Clinton, &c. by the corporation of the city, the governors of the New-York Hospital, the students attending the medical schools, and from many of the most respectable inhabitants of this city; and the zeal manifested upon this subject reflects much credit upon the officers and members of these respective associations. The Botanic Garden accordingly became the property of the state of New York, by an act of their legislature, passed on the 12th of March, 1810. The honourable the regents of the university, immediately upon this purchase being effected, allotted that extensive botanical establishment to the use of the College of Physicians and Surgeons, for the laudable purpose contemplated by the legislature. The late proceedings of the legislature, in relation to the Botanic Garden, have been stated elsewhere. It is proper to add that the enterprising and public-spirited founder of this institution, Dr. Hosack, in 1811, published a second edition, enlarged, of the *Hortus Elginensis, or a Catalogue of the Plants, indigenous and exotic, cultivated in the Elgin Botanic Garden*, arranged in alphabetical order, and embracing the generic and specific names of Linnæus, the synonymes of various authors, the popular appellations by which they are known, the use of the different plants in medicine and the arts, &c. See a *Statement of Facts relative to the establishment and Progress of the Elgin Botanic Garden, and the Subsequent Disposal of the same to the State of New-York*; *Hortus Elginensis: American Medical and Philosophical Register*, vol. 2, from which most of the preceding account has been taken.

It is ardently hoped that an institution so honourable to the individual by whom it was originally projected, and by whose care and munificence it has been eminently conducive to the promotion of the science of botany, may not be impaired in its character or usefulness through any want of public support; and it is respectfully suggested that nothing could more effectually secure the important objects of this institution than some permanent provision made by the legislature, and the annexation to the establishment of a botanical professorship.

NOTE 4.

The science of medicine is prosecuted with distinguished success in this country; and the contributions which it has received from its cultivators in different parts of the United States are numerous and highly important. To enter into a detail of those circumstances which modify the character of the diseases of America, and to state the different methods of treatment which appears to be indicated upon the difference of type in our disorders when compared with diseases of the like nature prevailing in other latitudes, would lead to an extent of remark altogether beyond the limits prescribed on this occasion. The present note is intended to embrace only some of the leading circumstances connected with the origin, progress, and present condition of medical science in this state.

The first essay made in the United States for the purpose of imparting anatomical knowledge by means of dissection, was made in New-York, by doctors John Bard and Peter Middleton, two of the most distinguished practitioners of this city. The first attempt towards the promotion of a medical school in the state of New-York was made in the year 1767, during the administration of sir Henry Moore and lieutenant governor Colden. In the following year the medical school was organized, under the direction and government of the college of the province, then called King's College, and a body of able professors appointed to teach the several branches of medical science. Among the professors we find Samuel Bard, Peter Middleton, and Samuel Clossey, names familiarly known to those acquainted with the medical annals of North America.— In 1769, in consequence of a public address delivered by dr. Samuel Bard, a very important addition was made to the means of medical education then afforded, by the establishment of the New-York Hospital. The great advantages which the medical school of New-York thus possessed were, however, but of temporary duration: the revolutionary war occasioned a suspension of the salutary labours of the professors connected with the school; the teachers and students were scattered, and the college converted by the enemy into a military hospital. After the peace of 1783 the former medical professors were never, as a body, reinstated in the situation in the college; they having been separated either by accident or death. An attempt to revive the medical school in the following year proving ineffectual, the design was relinquished until 1792.— In this year, Columbia College was made to embrace two faculties: a faculty of arts, and another of physic; over the former presided William Samuel Johnson, LL. D., a gentleman in every respect qualified to the station; at the head of the latter continued, for some time, the learned and distinguished Samuel

Bard, M. D. as dean. Among the professors who were appointed to deliver lectures on the different branches of medicine, were several gentlemen of acknowledged talents and great professional merit. The exertions of the trustees of Columbia College, in their annexing a medical school to that institution, are deserving of the highest commendation; and it cannot be denied that the science of medicine was promoted by its establishment, particularly in this state.

By an act passed by the legislature of this state in March 1791, the hon. the regents of the university were authorised to institute a College of Physicians and Surgeons. The power thus vested in them they thought proper to exercise in 1807; and, accordingly, a charter for the purpose of establishing a College of Physicians and Surgeons in the city of New-York was granted, bearing date the 12th of March 1807. The establishment of an institution to be exclusively devoted to the cultivation and diffusion of medical science under the patronage of the regents of the university, and its sanction by the legislature, were circumstances viewed with the greatest satisfaction, and afforded just cause of congratulation to the friends of science throughout the state. That the high expectations which were entertained of the benefits that would flow to the community from its establishment were well founded, the history of the college during the time it has been in operation presents the most conclusive evidence. In November, 1807, the business of the medical college commenced, and courses of instruction were delivered on all the branches of medicine. The ability and success with which the teachers filled the important stations assigned them was such, that the legislature, at their next session, made the liberal appropriation of twenty thousand dollars for the benefit of the college. The whole number of students who attended to the institution the *first* year was fifty-three; the *second* year there was seventy-two students; a greater number than had ever before resorted to a similar institution for medical instruction in this city: the *third* year the college was attended by seventy-three students from New-York, and other states in the union.

In 1810 the rapid progress of the college in its importance and usefulness received a temporary check; and its brilliant prospects were, for a while, overcast, owing to certain misunderstandings having taken place between the then president and professors. The regents of the university, upon receiving authentic information of the dissensions which had thus been created, with the same laudable zeal for the promotion of medical science with which they had originally been induced to organize the establishment, immediately adopted measures for ascertaining the cause of the mischief, and for the removal of every obstacle which might retard its prosperity. This they did at their meeting held at Albany on the 1st of April, 1811. Upon the reorganization of the College of Phy-

sicians and Surgeons, at this period, the venerable Samuel Bard, M. D. was appointed president; material alterations were made in several of the professorships, and important changes were effected as to the internal government of the institution. The Elgin Botanic Garden, founded by Dr. Hosack, and lately purchased by the state, was now committed to the college by the regents, for the laudable purpose of promoting medical science; the legislature also during this year made a further grant of five hundred dollars per annum for the benefit of the college. About this time power was granted the college to confer degrees in medicine.

In noticing the condition of the college in 1812, the regents of the university, in their report to the legislature, observe, "The organization of the College of Physicians and Surgeons has been improved, and it now presents a fair prospect of speedily rising to a state of usefulness and celebrity, such as may be justly expected from the importance of the community in which it is situated, and the government under whose auspices it has been erected. A gentleman universally acknowledged among the first in the medical profession in America, has consented to be placed at the head of it, and professors of the best talents have been procured to deliver instruction in it."

The importance of the services rendered the college by the late measures of the regents and the legislature soon became apparent. On the 15th of May, 1811, the first medical commencement in the institution was held, and the degree of doctor of medicine granted to eight students who had previously undergone the necessary examinations prescribed by its laws, and publicly defended their respective inaugural dissertations. This was a greater number of degrees in medicine than was ever before granted at one time in this city. Since that time twenty-seven gentlemen have received the honours of the medical doctorate in this college; all of whom had received their education there. Of the whole number of graduates seven have published their inaugural dissertations.

In order most effectually to augment still farther the means of medical education afforded by the college, the board of trustees, in May, 1813, appropriated a considerable part of their funds to the purchase of ground as a permanent situation for the college, and completed the elegant and commodious building which they now occupy in Barclay street. The anatomical, the chymical, the natural history, and other departments of the college, which had, at different times been enlarged, were also most materially improved and enriched.

In September, 1813, one of the most important and desirable events took place which has ever been recorded in our medical annals; the consolidation of the two medical schools of this city into one great establishment for the promotion of medicine. In their address of the above date the College of Physicians and Surgeons state that a union has been honourably entered into between

them and the Faculty of Medicine of Columbia College. The trustees of Columbia College accordingly, soon after, annulled their statutes which authorized the connexion of a medical school with their institution, and the regents of the University, in March, 1814, confirmed the agreement which had been entered into between the College of Physicians and Surgeons, and the Medical Faculty of Columbia College.

Ample courses of instruction, on the following branches of science, are now provided by the state medical school of this city: *anatomy, physiology, and surgery; theory and practice of physic and clinical medicine; chymistry; principles and practice of surgery; clinical medicine; materia medica; midwifery, and the diseases of women and children; medical jurisprudence; natural history; natural philosophy.*

The legislature of this state, with the wonted liberality they have uniformly manifested for the promotion of useful knowledge, at their last session authorized the raising of the further sum of thirty thousand dollars to be applied to the purposes of the College of Physicians and Surgeons of this city. It is not deemed necessary here to recount the great advantages which the city of New-York possesses for a great medical establishment. With a population equal to that of most of the capitals of Europe, and composed of inhabitants from all parts of the world: with a large and well-endowed hospital, and other public charities: its botanic garden; its well-organized medical school; the extensive system of education which it embraces; and its learned and able teachers, induce the belief that the College of Physicians and Surgeons is second to no medical establishment in the United States; and in their choice of such a place for the special cultivation of medicine, the regents of the university have manifested the wisdom of their heads, and the excellence of their hearts. For further particulars relative to the progress of medicine in this state, see *Middleton's Medical Discourse, Bard's Address, Historical Sketch of the College of Physicians and Surgeons*, in *Amen. Med. and Phil. Register*, and other parts of the same work; *Hosack's Account of the Med. Schools of New-York and Philadelphia; Syllabus of the several Courses of Lectures delivered in the Col. of Phys. and Surg. N. Y. 1814; Reports of the Regents of the University.*

NOTE 5.

The Society for the Promotion of Useful Arts has published three volumes of its transactions at the expense of the state, containing a great body of useful information, relative to the husbandry and manufactures of the country. The

Academy of Arts, principally for want of a suitable place to exhibit its collections, has not prospered in proportion to its importance. If the application to the corporation of the city to assign spacious apartments for this institution, and the Literary and Philosophical, and Historical Societies, shall succeed, (and, from the invariable public spirit displayed by that body, there is every reason to believe it will,) and if the plan for establishing professorships in painting, sculpture, engraving, architecture, &c. shall also be carried into effect, there can be no doubt but that (notwithstanding the unpropitious state of things for the cultivation of the arts and sciences) this useful establishment will flourish. The New-York Historical Society was established, in imitation of a similar institution in Massachusetts, for the purpose of collecting materials for illustrating the natural, civil, ecclesiastical, literary, and medical history of America. The Massachusetts society has published ten volumes of interesting matter; that of New-York, besides publishing two volumes, has made a rare, invaluable, and extensive collection of books, pamphlets, manuscripts, newspapers, maps, medals, &c. worth at least ten thousand dollars, for which it is greatly indebted to the indefatigable exertions of John Pintard, esq. the rev. Timothy Alden, and dr. John W. Francis. The legislature of the state, deeply impressed with the importance and merits of this establishment, and under the influence of a magnanimous policy, conferred upon it last year a donation of twelve thousand dollars, which will insure its permanent usefulness. The congress of the United States have also directed the public documents to be sent gratuitously to the several Historical Societies; and the legislature of New-York have made a similar arrangement respecting this institution.

NOTE 6.

The agency of dr. Franklin, in projecting and arranging the American Philosophical Society, will be seen by the following interesting document, with which I have been favoured by Cadwallader D. Colden, esq. the distinguished grandson of the late dr. Colden. I here publish this paper from the copy originally transmitted to lieutenant governor Colden, by the celebrated american botanist, John Bartram. In this communication Franklin makes mention of himself as the writer of the *proposal*; and it is highly probable that the first idea of the institution originated with him. In a subsequent letter of dr. Franklin, dated New-York, April 5, 1744, addressed to dr. Colden, and published in the American Medical and Philosophical Register, vol. 2. Franklin states, that "so far as it relates to Philadelphia, the society is formed, and has had several meetings

to mutual satisfaction." Among the members at that time we find Thomas Godfrey, the mathematician, William Parsons, the geographer, John Bartram, botanist, James Alexander, esq. of New-York, and Thomas Hopkinson as president of the society. About this period dr. Colden became an active and most useful associate in this confederacy for the promotion of useful knowledge in british America.

" A PROPOSAL for promoting useful knowledge among the british plantations in America.

The *english* are possessed of a long tract of continent, from *Nova Scotia* to *Georgia*; extending north and south through different climates, having different soils, producing different plants, mines, and minerals; and capable of different improvements, manufactures, etc.

The first drudgery of settling new colonies, which confines the attention of people to mere necessities, is now pretty well over; and there are many in every province in circumstances that set them at ease, and afford leisure to cultivate the finer arts, and improve the common stock of knowledge. To such of these who are men of speculation, many hints must from time to time arise; many observations occur, which, if well examined, pursued, and improved, might produce discoveries to the advantage of some or all of the *british* plantations, or to the benefit of mankind in general.

But as, from the extent of the country, such persons are widely separated, and seldom can see and converse, or be acquainted with each other, so that many useful particulars remain uncommunicated, die with the discoverers, and are lost to mankind; it is, to remedy this inconvenience for the future, proposed,

That one society be formed of virtuosi, or ingenious men, residing in the several colonies, to be called *The American Philosophical Society*; who are to maintain a constant correspondence.

That *Phil-delphia*, being the city nearest the centre of the continent colonies, communicating with all of them northward and southward by post, and with all the islands by sea, and having the advantage of a good growing library, be the centre of the society.

That at *Philadelphia* there be always at least seven members; viz. a physician, a botanist, a mathematician, a chymist, a mechanician, a geographer, and a general natural philosopher; beside a president, treasurer, and secretary.

That these members meet once a month, or oftener, at their own expense; to communicate to each other their observations, experiments, etc. to receive, read, and consider such letters, communications, or queries, as shall be sent from distant members; to direct the dispersing of copies of such communications as are

valuable, to other distant members, in order to procure their sentiments thereupon, etc.

That the subjects of the correspondence be, all new-discovered plants, herbs, trees, roots, etc. their virtues, uses, etc. methods of propagating them, and making such as are useful, but particular to some plantations, more general. Improvements of vegetable juices, as ciders, wines, etc. New methods of curing or preventing diseases. All new-discovered fossils in different countries, as mines, minerals, quarries, etc. New and useful improvements in any branch of mathematics. New discoveries in chymistry, such as improvements in distillation, brewing, assaying of ores, etc. New mechanical inventions for saving labour; as mills, carriages, etc. and for raising and conveying of water, draining of meadows, etc. All new arts, trades, manufactures, etc. that may be proposed or thought of. Surveys, maps, and charts of particular parts of the sea coasts, or inland countries; course and junction of rivers and great roads, situation of lakes and mountains, nature of the soil and productions, etc. New methods of improving the breed of useful animals; introducing other sorts from foreign countries. New improvements in planting, gardening, clearing land, etc. And all philosophical experiments that let light into the nature of things, tend to increase the power of man over matter, and multiply the conveniences or pleasures of life.

That a correspondence, already begun by some intended members, shall be kept up by this society with the Royal Society of *London*, and with the Dublin Society.

That every member shall have abstracts sent him quarterly, of every thing valuable communicated to the society's secretary at *Philadelphia*, free of all charge except the yearly payment hereafter mentioned.

That by permission of the postmaster-general, such communications pass between the secretary of the society and the members, postage free.

That for the defraying the expense of such experiments as the society shall judge proper to cause to be made, and other contingent charges for the common good, every member send a piece of eight *per annum* to the treasurer at *Philadelphia*, to form a common stock, to be disbursed by order of the president with the consent of the majority of the members that can conveniently be consulted thereupon, to such persons and places where and by whom the experiments are to be made, and otherwise, as there shall be occasion; of which disbursements an exact account shall be kept, and communicated yearly to every member.

That at the first meetings of the members at *Philadelphia*, such rules be formed for regulating their meetings and transactions for the general benefit as shall be convenient and necessary; to be afterwards changed and improved as

there shall be occasion, wherein due regard is to be had to the advice of distant members.

That at the end of every year collections be made and printed, of such experiments, discoveries, improvements, &c. as may be thought of public advantage; and that every member have a copy sent him.

That the business and duty of the secretary be, to receive all letters intended for the society, and lay them before the president and members at their meetings; to abstract, correct, and methodize such papers, &c. as require it; and as he shall be directed to do by the president, after they have been considered, debated, and digested in the society; to enter copies thereof in the society's books, and make out copies for distant members; to answer their letters by direction of the president, and keep records of all material transactions of the society, &c.

Benjamin Franklin, the writer of this proposal, offers himself to serve the society as their secretary, till they shall be provided with one more capable.

Philadelphia, May 14, 1743."

NOTE 7.

The appearance of the lands belonging to the Holland Company, particularly from Batavia to Lake Erie, furnishes strong indications of the recession of that lake. Near Vandeventer's tavern, in Niagara county, about twenty-two miles from the lake, there is a perpendicular descent which is said to extend from the Genesee river to Black Rock; between it and the Stone Ridge, which runs from the Genesee river to Lewiston, there is an immense valley, twenty miles across called Tonewanto Valley. The precipice at Vandeventer's is from one hundred to two hundred feet, composed principally of limestone and flint; combined like those on Bird Island, at the outlet of the lake, and bearing every mark of the attrition and abrasion of the waves. The rocks are scooped out by the water. On digging a cellar here, a great collection of lakesand, and another of gravel, were found. Might not Lake Erie have formerly covered the Tonewanto Valley and formed an immense bay, when the Niagara falls were at Queenstown? and on the recession of the cataract, might not Lake Erie have retreated from the valley? perhaps the stone ridge was the boundary between Lake Erie and Ontario? or might not Lake Erie have formerly discharged itself by the Tonewanto Valley into the Genesee river? it is, however, believed by some that this lake formerly discharged itself by the Chicago creek, and Illinois and Mississippi rivers, into the Gulf of Mexico, before the supposed barrier

at Lewiston was broken down. Between Vendeveuer's and this precipice are to be found a great variety of fossil shells and petrifications, embedded in limestone.

On another occasion I made the following statement in relation to Lake Ontario: "From near the Genesee river to Lewiston, on the Niagara river, there is a remarkable ridge, or elevation of land, running almost the whole distance which is seventy-eight miles, and in a direction from east to west. Its general altitude above the neighbouring land is thirty feet, and its width varies considerably; in some places it is not more than forty yards. Its elevation above the level of Lake Ontario is, perhaps, one hundred and sixty feet, to which it descends by a gradual slope, and its distance from that water is between six and ten miles. There is every reason to believe that this remarkable ridge was the ancient boundary of this great lake. The gravel with which it is covered was deposited there by the waters, and the stones every where indicate by their shape the abrasion and agitation produced by that element. All along the borders of the western rivers and lakes there are small mounds, or heaps of gravel, of a conical form, erected by the fish for the protection of their spawn: these fish banks are found at the foot of the ridge, on the side towards the lake; on the opposite side none have been discovered. All rivers and streams which enter the lake from the south have their mouths affected with sand in a peculiar way, from the prevalence and power of the northwesterly winds. The points of the creeks which pass through the ridge correspond exactly in appearance with the entrance of the streams into the lake. These facts evince, beyond doubt, that Lake Ontario has receded from this elevated ground: and the cause of this retreat must be ascribed to its having enlarged its former outlet; or to its imprisoned waters (aided, probably, by an earthquake) forcing a passage down the present bed of the St. Lawrence." *Collections of the New-York Historical Society, vol. 2.*

The little falls on the Mohawk river, in connexion with the surrounding country, exhibit a very interesting aspect. As you approach the falls the river becomes narrow and deep; and you pass through immense rocks principally of granite interspersed with limestone. In various places, you observe profound excavations in the rocks made by the agitation of pebbles in the fissures, and in some places the river is not more than twenty yards wide. As you approach the western extremity of the hills you find them about half a mile distant from summit to summit; and at least three hundred feet high. The rocks are composed of granite, and many of them are thirty or forty feet thick, and the whole mountain extends, at least, half a mile from east to west. You see them piled on each other like Ossa on Pelion; and in other places huge fragments scattered about indicating evidently a violent rupture of the waters through this place, as

if they had been formerly dammed up and had forced a passage ; and in all directions you behold great rocks exhibiting rotundities, points, and cavities ; as if worn by the violence of the waves, or hurled from their ancient positions.

The general appearance of the little falls indicates the former existence of a great lake above, connected with the Oneida lake ; and as the waters forced a passage here and receded, the flats above were formed and composed several thousand acres of the richest land. Rome being the highest point on the lake, the passage of the waters on the east side left it bare ; the Oneida lake gradually receded on the west side, and formed the great marsh or swamp, now surrounding the waters on Wood creek. The physiognomy of the country from the commencement of Wood creek to its termination in the Oneida lake, confirms this hypothesis. The westerly and northwesterly winds continually drive the sand of the lake towards the creek, and you can distinctly perceive the alluvions increasing eastward by the accumulation of sand, and the formation of new ground. Near the lake you observe sand without trees ; then to the east a few scattering trees ; and as you proceed in that direction the woods thicken. The whole country from the commencement to the termination of Wood creek looks like made ground. In digging the canal in Wood creek, pine trees have been found twelve feet deep. An old boatman several years ago said that he had been fifty years in that employ, and that the Oneida lake had receded half a mile within his memory. William Colbreath, one of the first settlers at Rome, in digging a well found a large tree at the depth of twelve feet. This great lake breaking down in the first place the barriers which opposed the progress of its waters to the east, and then gradually receding to the west, is a subject well deserving of minute investigation.

It is supposed that the Hudson river opened a new route for itself by prostrating the mountains at the highlands, and that its former course lay through one of the vallies to the west.

Among similar instances which might be adduced, as having occurred in the old world, I might refer to the Caspian Sea and Lake Aral ; which were supposed to have been formerly united. The Caspian Sea is three hundred leagues long, and fifty broad. Lake Aral about one hundred leagues long, and fifty broad ; the latter is about one hundred leagues east of the former ; the intervening country is a sandy desert ; neither have an outlet ; both are salt, and the surplus waters are carried off by evaporation. The Caspian receives no rivers from the east, and Lake Aral none from the west. From these circumstances it is inferred that they were formerly united.

Since the cultivation of our country great changes have taken place in rivers, streams, and small lakes. Some that were formerly full of water are nearly dry,

and others are entirely so. These changes will proceed, and they may be ascribed to the following causes :

1. The cutting down of the woods, and the draining of swamps, expose the waters to the power of the sun, and dry up the sources from whence they proceed.

2. Cultivation increases the alluvions of rivers, etc. by loosening the soil, and depriving it of the trees and plants which prevented it from being carried off by the water.

NOTE 8.

The fossil shells and petrifications which have been discovered all over the world, on the loftiest mountains as well as in the bowels of the earth, are justly considered as the most interesting phenomena of nature. Linnæus says that, "the innumerable petrifications of foreign animals, and of animals never seen by any mortal in our day, which often lie hid among stones under the most lofty mountains, are the only *remaining fragments of the ancient world.*" Buffon denominates them the *monuments*, and Pallas styles them the *medals, of nature.* Dr. Barton has expressed this idea in the following impressive language : "I consider the petrifications and impressions which are found on many of our mountains, as some of the most interesting medals of the revolutions which our country has undergone."

This country furnishes these medals of nature in as great variety and abundance as any in the world. They are found in a number of forms ; 1. The fossil shell detached from any other substance ; 2. The real shell embedded in, or adhering to, stone ; 3. The impressions on stone of the elevated and concave surfaces of the shells, without any vestige of them.

Kalm made many interesting discoveries of petrifications in the northern parts of this state. On the mountains at Crown Point he found petrifications of all kinds ; and chiefly pectinites, or petrified *ostrea pectines* ; and sometimes whole strata of the latter, consisting merely of a quantity of shells of this sort grown together ; generally small, and never exceeding an inch and a half in length. Some of the shells were very elevated, especially in the middle, where they formed, as it were, a lump ; others again were depressed in the middle ; but in most of them the outward surface was remarkably elevated, and the furrows always run longitudinally from the top diverging to the margin. These petrifications were principally found in black limestone, lying in lamellæ, as slates do, and might be called a kind of slates convertible into quick lime by fire. The strata which lay uppermost in the mountains, consisted of a gray limestone. The black limestone is the marmor

schistomum of Linnæus, and the schistus calcarius of Forster. Kalm also saw in this place many petrified cornua ammonis; among them were some petrified snails. Some of these cornua were remarkably large; for they measured above two feet in diameter. Different kinds of coral could be plainly seen and separated from the stone in which they lay: some were white and lithophytes; others were starry corals or madrepores.

In one place, near the shore of Lake Champlain, he saw a number of petrified cornua ammonis, in gray limestone. Some of this stone contained a number of petrifications, with and without shells; and in one place he found prodigious large cornua ammonis about twenty inches in breadth. In some instances the water had worn off the stone, but could not have the same effect on the petrifications which lay elevated above, and in a manner glued on the stones. *Kalm's Travels, vol. 3.*

The principal seat of these fossils and petrifications are calcareous stones; this arises from the preserving power of the substance; but I have seen very curious ones in sandstone on lot No. 69. of the Cayuga reservation, in the county of Cayuga. This place is about three and a half miles from the Cayuga Lake. A ridge of rocks and stones extends a mile in a parallel direction with the lake. The higher stratum is composed of limestone, and the next adjoining one of sandstone; filled with marine substances. There is but one stratum of sandstone, of the thickness of two or three feet, and below and beneath, as well as above it, there is limestone. The sandstone contains several strange marine shells, which, I should, therefore, pronounce to be oceanic. There are littoral ones also, such as scallops and periwinkles. One strange substance is larger than a scallop, and one is like the great crab called a horseshoe in miniature. From the propinquity of the limestone I should suppose that the sand and marine substances were connected together by a solution of the calcareous matter. Some of the stones were probably ejected by torrents from the regular layers. The sandstones are found singly all over the adjacent fields, are easily broken, and when pounded or burnt are converted into fine marine sand. They are not only indented with the figures of shells, but contain the shells themselves in a petrified form.

These petrifications are certainly worthy of a more minute examination. Dr. Smith considered a very extensive collection of fish in sandstone, in the possession of an apothecary of Verona, a very great curiosity. I have no doubt but that a very interesting one of shells might be made from these immense strata of sandstone. *Vide J. E. Smith's Sketch of a Tour on the Continent, vol. 3.*

NOTE 9.

In the country about Salina, the place where the principal manufactory of salt is, there are immense quantities of gypsum. It appears that there is some natural affinity between gypsum and salt. Mr. Pennant thus speaks of Northwich, a small town long famous for its rock salt and brine pits: "The stratum of salt lies about forty yards deep. Above the salt is a bed of whitish clay (argilla cœrula-cinerea) used in making the Liverpool earthen ware; and in the same place is also dug a good deal of the gypsum, or plaster stone. The fossil salt is generally yellow and semi-pellucid, sometimes debased with a dull, greenish earth, and is often found, but in small quantities, quite clear and colourless." *Tour in Scotland, 1769.*

NOTE 10.

It is highly probable that there are other springs of petroleum in other parts of the country. Large oil stones are found at the indian saw mill twelve miles up the buffalo creek. strongly impregnated with Seneka oil. These stones are produced from bituminous springs flowing over beds of madrepores under ground. Pennant says, that petroleum, or rock oil, is found sometimes in the mines in Wales, has an agreeable smell, and is esteemed serviceable in rheumatic cases, if rubbed on the parts affected. The miners call it the fairies' butter. *Tour in Wales, vol. I.*

But the most extraordinary bituminous springs of which we have any account, are in the Birman empire. In the province of Arracan, major Symes met with a considerable cluster of them, the depth of whose wells was about thirty-seven fathoms, and the column of oil contained in them generally as high as the waist of those who descended for the purpose of collecting it. *Symes's Embassy to Ava.*

NOTE 11.

Since writing this discourse I have been favoured with "A Discourse on some of the Principal Desiderata in Natural History, and on the best means of Promoting the Study of this Science in the United States," by Dr. Barton, of Philadelphia. I regret that I had not before the benefit of this ingenious and learned work, having been often instructed by other writings of this distinguish-

He then divides the class mammalia into the following orders :

1. Cétacea.
2. Ruminantia ; all cloven-footed.
3. Pachydermata ; more than two toes to the foot ; incisive teeth in both jaws, and frequently enormous canine teeth.
4. Solipeda ; having only one apparent toe to each foot.
5. Tardigrada ; toes united by the skin and cannot be moved separately ; no dentes incisorcs.
6. Edentata ; resembling the former in the little freedom of the toes and the want of the incisores ; have a simple stomach.
7. Rodentia ; claws ; long incisive teeth at the end of each jaw, without any canine teeth.
8. Sarcophaga ; like the former in the claws, but a more complete set of teeth ; incisores short and strong ; canine teeth and molares.
9. Amphibia.
10. Bats.
11. Quadrumana, which of all the mammiferous animals are those that most resemble man.

For the remaining outlines of this system see *G. Cuvier's Lectures on Comparative Anatomy*, translated by William Ross, vol. 1. art. 5.

NOTE 14

The traditions of the Indians, and the speculations of philosophers, respecting this enormous animal, have been various ; and, perhaps, on the whole, unsatisfactory. It is certain that the Indians had some notions respecting the mammoth, which they might have derived from tradition ; or, after seeing its remains, they might have invented the fables which exist. Charlevoix, in his *Voyage to North America*, (vol. 1.) says, " There is also a very diverting tradition among the Indians of a great elk of such a monstrous size, that the rest are like pismires in comparison of him ; his legs, they say, are so long that eight feet of snow are not the least encumbrance to him ; his hide is proof against all manner of weapons, and he has a sort of arm proceeding from his shoulders which he uses as we do ours. He is always attended by a vast number of elks, which form his court, and which render him all the service he requires." This description respecting the arm appears like the proboscis of an elephant. Kalm, who travelled in this country in 1749, says, " Some years ago a skeleton of an amazing great animal had been found in that part of Canada where the Illinois live on the river Ohio,

The Indians were surprised at the sight of it; and when they were asked what they thought it was, they answered that it must be the chief or father of all the heavens. It was of prodigious bulk, and had thick white teeth about ten inches long. It was looked upon as the skeleton of an elephant. A french lieutenant in the fort, who had seen it, assured me that the figure of the whole snout was yet to be seen though it was half mouldered. He added that he had not observed that any of the bones were taken away, but thought the skeleton lay quite perfect there. I have heard people talk of this monstrous skeleton in several other parts of Canada." *Kalm's Travels*, vol. 3.

During the revolution a delegation of warriors from the Delaware tribe told the governor of Virginia that it was a tradition handed down from their fathers, "that, in ancient times, a herd of these tremendous animals came to the big bone licks and began an universal destruction of the bear, deer, elk, buffaloes, and other animals which had been created for the use of the Indians; that the Great Man above, looking down and seeing this, was so enraged, that he seized his lightning, descended on the earth, seated himself on a neighbouring mountain, on a rock of which his seat and the print of his feet are still to be seen, and hurled his bolts among them till the whole were slaughtered, except the big bull, who, presenting his forehead to the shafts, shook them off as they fell; but missing one at length, it wounded him in the side; whereon springing round, he bounded over the Ohio, over the Wabash, the Illinois, and finally over the great lakes, where he is living at this day." *Jefferson's Notes on Virginia*.

In the year 1748, M. Fabri, who had made great excursions into the northern parts of Louisiana and the southern regions of Canada, informed Buffon that he had seen heads and skeletons of an enormous quadruped, called by the savages the father of oxen; and that the thigh bones of these animals were from five to six feet in length. *Buffon's Natural History*, translated by Smellie, vol. 9.

In Siberia a similar animal was supposed to exist under ground, and many fables were related respecting it, under the russian name of mammoth. Notwithstanding these traditions and reports, the attention of the philosophers of Europe was not fully drawn to this subject until 1765, when mr. George Croghan saw, in the vicinity of a large salt marsh, on the country bordering on the Ohio, immense bones and teeth, and he sent some of them to England, where they immediately became the subject of speculation and discussion; before this similar bones were discovered in the russian dominions. Dr. Hunter, a celebrated anatomist, from an examination of the teeth, pronounced them to belong to a carnivorous non-descript animal. Daubenton declared, at one time, that this animal was an elephant, and at another time thought that the teeth were those of an hippopotamus, and conceived that the animal partook of both those species, and was a real mule. Muller supposed that they belong to certain unknown quadrupeds, denomi-

nated mammoths, or mammoths, from the russian name, supposed to have been derived from the hebrew behemoth. Buffon was of opinion that, independently of the elephant and hippopotamus whose relics are equally found in the two continents, another animal, common to both, has formerly existed; the size of which has greatly exceeded that of the largest elephants; and, at one period, he supposed that it was seven times larger. Pallas believed, that the bones found in Siberia were those of the elephant and rhinoceros, and said that those countries, which are now desolated by the rigours of intense cold, have formerly enjoyed all the advantages of the southern latitudes. Gmelin supposes, that vast inundations in the south had driven the elephants to the north, where they would all at once perish by the rigour of the climate. Others were of opinion that the tusk and skeleton belonged to the elephant, and the molars to the hippopotamus; as the grinders were not those of the former: some thought they were the bones of the hippopotamus only; others of a monster of the ocean; and the abbe Clavigero says, "that they may, from what appears, have belonged to giants of the human, as well as of any other, race." Jefferson asserts "that the skeleton of the mammoth bespeaks an animal of five or six times the cubit volume of the elephant; and that the grinders are five times as large, are square, and the grinding surface studded with four or five rows of blunt points, whereas those of the elephant are broad and thin, and their grinding surface flat." To mention all the hypotheses and fables which this subject has produced, would be useless, and consume too much time; but I cannot omit stating two or three more on account of their whimsical absurdity. One writer says that the bones in question are the remains of certain angelic beings, the original tenants of this our terrestrial globe, in its primitive state, till, for their transgressions, both were involved in ruin, after which this shattered planet was refitted for its present inhabitants. Another imagines that at some remote period, the place in which the bones were found might have laid in the track of a conqueror unknown to the historians of Europe; that it might have been the scene of a battle, and the animals in question part of the baggage train destroyed by slaughter or disease, and left in the hurry of flight, or of pursuit, to puzzle and set at defiance generations then unborn.

Within a few years a better opportunity has been afforded of forming just conclusions respecting this animal. Within the extent of a few miles nine or ten skeletons have been discovered at the bottom of marl pits, in Orange and Ulster counties, and (from the calcareous nature of the substance in which they were deposited) in a high state of preservation. One of these skeletons has been mounted and placed in its natural form, and with almost all the bones, in Peale's Museum, in Philadelphia. Its height over the shoulders is eleven feet; over the hips, nine feet; from the chin to the rump, fifteen feet; from the point of the trunk to the end of the tail, following the curve, thirty-one feet; length in a

straight line, seventeen feet; length of the tusks, ten feet seven inches; weight of a grinder, four pounds ten ounces; of the whole skeleton, one thousand pounds.

In 1799, upon the shores of the Frozen Ocean, near the mouth of the river Lena, in Siberia, a toungeuse chief discovered, in the midst of a rock of ice, a substance which did not resemble the floating pieces of wood usually found there: he endeavoured in vain to discover what it was at that time: about the close of the second summer the melting of the ice enabled him to know that it was a mammoth; but he could not succeed in obtaining the tusks of the animal until the end of the 5th year, when the ice which enclosed it, having partly melted, the level became sloped, and this enormous mass, pushed forward by its own weight, fell over upon its side on a sand bank. In March, 1804, the chief Schounachoff obtained the tusks and sold them for fifty roubles. In the summer of 1806, Michael Adams, a member of the Academy of St. Petersburg, visited the mammoth in company with the chief, and found it in a very mutilated state. The proprietor was content with the profit he had already derived from it, and the jakouts of the neighbourhood tore off the flesh, with which they fed their dogs. Ferocious animals, white bears of the north pole, gluttons, wolves, and foxes, preyed upon it also, and their burrows were seen in the neighbourhood. The skeleton, almost completely unfleshed was entire, with the exception of one of the forefeet. The spindyle, from the head to the os coccygæ, a shoulder blade, the pelvis, and the remains of the three extremities, were still tightly attached by the ligaments of the joints, and by strips of skin on the exterior side of the carcass. The head was covered with a dry skin; one of the ears, well preserved, was furnished with a tuft of bristles. The eyes were also preserved, and the ball of the left eye could be distinguished. The tip of the under lip had been eaten away, and the upper part being destroyed, exhibited the teeth. The brain was still in the cranium, but it appeared dry. The parts least damaged were a forefoot and a hind one, covered with skin, and having still the sole attached. According to the assertion of the chief, the animal had been so large and well fed, that its belly hung down below the knee joints. This animal was a male, with a long mane at its neck; but it had no tail, and no trunk. The skin, three fourths of which Mr. Adams took with him, is a deep gray, and covered with a reddish hair, and black bristles, and was of such extraordinary weight, that ten persons moved it with great difficulty. The entire carcass (the bones of which he collected on the spot, and the tusks he afterwards procured) is about nine feet high and fourteen feet long, english measure, from the tip of the nose to the coccyx; without, however, comprehending the two horns, or tusks, each of which is a toise and a half long, and both together weigh four hundred pounds. The head alone weighs four hundred and sixty pounds. Mr. Adams

collected from the sand bank more than forty pounds of the bristles which the white bears might have trodden into the wet ground on devouring the flesh. Some of the hair was presented to the Museum of Natural History of Paris, and on examination it was found to consist of three distinct kinds; one of these is stiff black bristles, two feet in length; another is thinner bristles of coarse flexible hair, of a reddish brown colour, and the third is a coarse reddish brown wool which grew among the roots of the long hair; affording, according to Cuvier, an undeniable proof that this animal has belonged to a race of elephants inhabiting a cold region. See an Account of a Journey to the Frozen Seas, and of the Discovery of the Remains of a Mammoth, by Michael Adams of St. Petersburg, in the 29th volume of *Tilloch's Philosophical Magazine*; and *Cuvier's Essay on the Theory of the Earth*, translated by Jameson.

Mr. Adams was persuaded, from the presence of the coccyx, which finishes the vertebral column, that this animal had a very short and thick tail, like its feet. He also states that its teeth are harder, heavier, and more twisted in a different direction, than the teeth of an elephant; that he has seen some of their tusks, which formed, in their curvature, three fourths of a circle, and one of the length of two toises and a half, two feet thick near the root, and two hundred and eighty pounds weight; that the animal is covered with a very thick hair through the whole body, and has a long mane upon its neck; and he believes, that, although no trunk was found, yet that it had one which was carried off by wild beasts; for it would be inconceivable that it could eat with so small a snout and with such enormous tusks without a proboscis; and he fully believes that it is quite different from that found in Ulster county in this state.

M. Humboldt, in his letters dated Lima, 1802, to G. Delambres, one of the perpetual secretaries of the National Institute, says, "Beside the elephants' teeth which we sent to G. Cuvier, from the land of Santa Fee, one thousand three hundred and fifty toises in height, we have preserved for him others more beautiful: some of the carnivorous elephant, and others of a species a little different from those of Africa, brought from the valley of Timaney, the town of Iborra, and from Chili. Here, then, we have confirmed the existence of that carnivorous monster from the river Ohio, from fifty degrees northern latitude to thirty five degrees south latitude."

"Near Santa Fee there are found, in the Campo de Gigante, at the height of one thousand three hundred and seventy toises, an immense number of fossil elephants' bones, both of the african species and of the carnivorous kind, discovered near the Ohio. We caused several to be dug up, and have sent some specimens of them to the National Institute. I much doubt whether any of these bones were ever before found at such a great height: since that time I have received two from a place of the Andes, situated about two degrees of latitude from Quito

and Chili; so that I can prove the existence and destruction of these gigantic elephants, from the Ohio to the country of the Patagonians." *Philosophical Magazine*, vol. 16.

The discoveries of such enormous remains turned the attention of philosophers to the living elephants, and it has been satisfactorily established, that there are two distinct species of them; whereas before they were considered varieties; the asiatic, denominated *elephas indicus*, and the african, termed *elephas capensis*. The *elephas capensis* has the front of the head convex and inclined, the tusks larger, and the perpendicular layers of enamel, which, with the softer osseous matter, compose the grinders, exhibiting on the top or worn surface a number of rhomboidal spaces, and which are equally observable in a transverse section of the tooth. The *elephas indicus* is larger; the front of the skull, instead of being convex, is deeply concave, and the upper part so dilated as to exhibit two pyramidal elevations: and the grinders have the enamel layers disposed in the osseous substance, in distinct transverse parallel lines, instead of rhomboidal compartments. Its height appears to be from ten to fourteen feet, and one of the larger size is generally about sixteen feet long, from the front to the origin of the tail. The circumference of the neck seventeen feet, and of the body, in its most dilated part, about twenty-six feet. The legs are short, and about six feet in circumference; the tail slender, and about six feet long. These are the dimensions of the large elephants, and exceed those of the ordinary size by nearly one third.

The mammoth of New York, although bearing some general resemblance to the elephant, differs from it in the general figure; in the tusks, formation of the head, prominence and pointedness of the back over the shoulders, its great descent thence to the hips, together with the comparative smallness of the body; there are proofs of greater activity also in the structure of the thigh bones, and the formation of the ribs; which are peculiar, and indicative of greater strength. It also differs in the magnitude of the spines of the back; the proportionate length of the processes from the spine of the scapula; the thickness and strength of all the bones, particularly of the limbs; the teeth, which are of the carnivorous kind; its under jaw, which is distinctly angular, instead of being semicircular, as in the elephant, beside several other striking distinctions. There can be little doubt but that it is, therefore, at least, specifically distinct from the elephant. *Philosophical Magazine*, Peale's account, vol. 14.

The examination of the asiatic mammoth has also settled the question as to its identity with the american. They are considered as specifically, if not generically, different.

Blumenbach has termed the asiatic mammoth *elephas primævus*, or *primogenus*, and the american mammoth the *elephas americanus*. Cuvier calls it the *mā-*

tedontus, which name has been adopted by dr. Barton. In the memoirs of the National Institute, Cuvier describes the former *elephas mamonteus*, maxilla obtusiore, lamellis molarium tenuibus rectis; and the latter he characterizes as follows. *elephas americanus*, molaribus multi-cuspidibus, lamellis post detritionem quadrilobatis. In his opinion neither of them are the same as the existing elephant; and he considers them as extinct. *Sciences Phys. et Nat. II.*

Mr. Tilesius sent to dr. Barton of Philadelphia some fine large drawings of the mammoth, described by Adams as found near the mouth of the Lena, whereby he had an excellent opportunity of comparing it with Peale's; and he is of opinion, that although very different from the ohio animal, yet that there are great and striking affinities. In opposition to Cuvier he believes that the ohio bones bespeak an animal not generically different from the elephant; that, although in the general form of the molares and the disposition of the vitreous body or enamel upon and through them, the ohio mammoth differs materially from the extinct as well as the existing elephants of the old world; and there is, in this respect, a much greater affinity between the asiatic mammoth, and the existing asiatic elephant, than between either them and the ohio, or american, mammoth; yet there are several other characters in which the resemblance is much closer between the ohio animal and the asiatic mammoth, than between the latter and the asiatic elephant; and that one of these characters consists in the great resemblance of the incisores, tusks, or horns. Dr. Barton is further of opinion that the asiatic mammoth has been discovered in different parts of the United States; and that a branch of the Susquehannah receives its name of Chemung from the incisores of one of these animals. *Port Folio, vol. 4. Barton's Letter to Jefferson.*

Governor Pownall, in a paper published in the Philosophical Magazine, (vol. 14.) after having viewed a skeleton of the New-York mammoth, exhibited by mr. Peale in London, is of opinion that it was a marine animal, from the following circumstances:

1. Its being carnivorous, and its enormous bulk would, therefore, require a supply of animal food from the earth which it could not get, and which could only be found in the abundance of the waters.
2. He thinks there are parts in the debris of the skull which have some comparative resemblance to the whale as to the purpose of breathing under water; that the width of the jaws is similar to that of fish; and that the ribs, more similar to those of fish than to those of terrestrial animals, are, by their construction and position, ordained to resist a more forcible external compression than the atmosphere creates.
3. That the neck is so short that the animal could not reach the ground with

its mouth, the line from the withers to the end of the under jaw being about one third of the line from the withers to the ground.

Mr. Peale says, that there are many reasons to suppose that he was of an amphibious nature, and is decidedly of opinion that he lived entirely on flesh or fish.

I fancy that while some may be willing to concur with Mr. Peale as to its amphibious nature, few will agree with Pownall in its being an aquatic animal. The shortness of its neck might have been supplied by a trunk. The points wherein it resembles in its formation certain fish, are only indicative of amazing strength; and there is no strong objection to believe that it was also graminivorous, and drew its supplies from the vegetable as well as the animal kingdom.

Upon the whole we may, with considerable confidence, come to the following conclusions:

1. That the asiatic and african living elephants and siberian mammoth are specifically distinct.
2. That the New-York, Ohio, or american mammoth is specifically, if not generically, different from them.
3. That it was carnivorous, and lived upon the land.
4. That it may have also been graminivorous or omnivorous, and amphibious.
5. That it was not of a larger size than the living elephant: and, lastly, that it is extinct. And let not this latter assertion be deemed incompatible with the designs of the deity. Individuals perish, and why not species and genera? The dispensations of providence are above the reach of human sagacity: much less can we object the fanciful system of the arabian metaphysicians, adopted by Pope in his Essay on Man, and exhibited in the following beautiful lines:

"See, through this air, this ocean, and this earth,
 All matter quick, and bursting into birth.
 Above, how high, progressive life may go!
 Around, how wide! how deep extend below!
 Vast chain of being! which from God began,
 Nature's ethereal, human, angel, man.
 Beast, bird, fish, insect, what no eye can see,
 No glass can reach; from infinite to thee—
 From thee to nothing. On superior powers
 Were we to press, inferior might on ours;
 Or in the full creation leave a void,
 Where, one step broken, the great scale's destroy'd.
 From nature's chain, whatever link you strike,
 Tenth, or ten thousandth, breaks the chain alike."

This doctrine of a chain of being is equally a superstition of philosophy and a dream of poetry. Many links have been broken in this imaginary chain; many species have been destroyed, and yet the harmony of nature has not been disturbed. The indefatigable Cuvier has classed the fossil remains of seventy-eight different quadrupeds, of which forty-nine are distinct species hitherto unknown to naturalists.

Since writing the above I have received the following well-written and ingenious letter from a gentleman who was present when the skeleton mounted in Peale's Museum was discovered, and whose knowledge of the subject and the surrounding country has given such an interest to the communication that I have thought fit to insert it at large.

DEAR SIR,

At the Introductory Discourse delivered by you to the "Literary and Philosophical Society of New York" I was present, and highly gratified at the organization of that society. It is gratifying to perceive institutions of this nature, having for their object useful information, springing up at a period of national peril and pressure. The acquisitions of science, in such times, and the devotedness to research, under such circumstances, are unerring evidences of the advancement of learning in our country.

The sources of information in our own state, as well as those of the country generally, afforded peculiar gratification to your delighted auditory. Amongst other objects and discoveries of importance, the remarks on the fossil bones of the mammoth discovered in our state particularly attracted my attention. Conceiving that a further development of this discovery might be interesting, and that the facts concerning it may be proper, I have ventured to address you this letter.

If the disclosures I shall make, and the opinions I may suggest, can be of use to you, they are very much at your service. Should they be of no other use they may indicate to the more acute observer, where are occult objects worthy of philosophical scrutiny and investigation.

Having participated in the procuring of these fossils and professing to be well acquainted with their discovery, as also the topography of the circumjacent country, I shall proceed to give you a plain detail of the facts in relation thereto.

The first discovery of these fossils was made in the town of Montgomery, in the county of Orange, about thirty years since, by the reverend Mr. Annin. The place of discovery was in a sunken and miry meadow; in digging a ditch to carry off the excess of water, several of the harder parts or bones of the mammoth skeleton were discovered; these were the ribs, two teeth, (grinders,) and part

of the thigh bone; the teeth and ribs were in a very sound state; but the others were considerably decayed, and an exposure to the air had such an effect upon them as to render their preservation useless. Subsequent to that time several scattered remains of skeletons of the same animal have been discovered; but from carelessness, or other causes, these have been lost. The speculations of persons who saw these phenomena were various, and, in some instances, ridiculous, affording no rational improvement to the naturalist. The advancement in agriculture, which began to show itself in the counties of Orange and Ulster at this period, while it enriched the husbandman, and beautified the country, was the cause of other discoveries of this nature; drew the subject before the public, attracted the immediate attention of literary men, and led to the exertions of the enterprising Mr. Peale of Philadelphia who procured two skeletons of these *non-descript* animals nearly entire; by the ingenuity and enterprise of that gentleman, these hidden treasures of natural history were brought to public view to astonish and delight the sons of science. At the time of this discovery it was my lot to be in the vicinity, and to contribute my exertions in taking them from their hidden depositories. The parts of these fossils heretofore discovered had excited an interest far short of their importance. The numbers being now increased, and a spirit of inquiry set on foot, excited a high degree of public interest. The *big bones* (as they were called) were exposed for show, and persons, from various motives, in great numbers, flocked to behold this heretofore hidden wonder. Having had an agency in prosecuting this research, and of bringing the fossils to light, I wrote to Dr. Mitchell a short account of their magnitude; the place of their discovery; the nature of the earth; &c. &c. which that gentleman, with his learned co-editors of the Medical Repository, thought worthy of a place in that excellent register of discoveries and of science. By a reference to that document the magnitude of the particular parts of the skeleton will be found. It is, however, unnecessary to insert them here as you have other sources of information which will lead to a more accurate and general result.

The nature and formation of this mammoth country, as well as the particular places where those animals were found, may possibly be interesting; and to this object I shall devote a few general remarks.

The only fossils of this skeleton which have been discovered, have been found in wet and miry lands, in the towns of Montgomery and Shawangunk. The former in Orange, and the latter in Ulster county, in this state: about eighty miles distant from this city, and from six to twelve miles from Newburgh, on the Hudson river.

In a western direction] from the Hudson for some five or six miles, the ground rises gradually, but perceptibly, until you come to the confines of Coldenham; the waters running easterly until you arrive here, now take the contrary

direction ; and turning westerly, are disembogued into a considerable stream known by the name of *Wall kill*, and sometimes the *Palts river*. On the highlands at Coldenham you perceive a range of high mountains, known by the name of "Shawangunk Mountains ;" from whence the waters run easterly, and falling into the Wall kill, are carried into the Hudson river, at the strand, near Kingston, in Ulster county, about one hundred and twelve miles distant from New-York.

These mountains on the west, and a ridge of highlands on the east, form a natural valley, of very considerable extent, varying in breadth from thirty-five in the southern to the northern extremity of about three miles. The formation and nature of this country has nothing to characterize it from other parts of our state in the middle district : the woods and forest trees, the grasses and productions of every kind, are those which are indigenous to various parts of the state, and to all the adjacent counties.

The general formation of this country is smooth, marked by some hills of secondary altitude, is susceptible of yielding every kind of produce cultivated in northern climates. The immense quantities of what is generally termed *Goshen butter*, is made in this valley ; and on the lands between it and the Hudson river, extending from New Cornwall, situate at the northern entrance into the highlands, to the point of land called the *Danse Kaumer*, in the town of Marlborough. In all this district of country the pasturage is luxuriant and excellent ; and affords a greedy repast for black cattle, sheep, &c. Whether the high flavour of the butter made in this vicinity is owing to the *peculiar* qualities of the pasturage, or to the *particular* manner of making it, is a matter of doubt.

The growing of hemp at the southwestern part of Orange county, has, of late years, been a favourite and profitable pursuit with the proprietors of a large tract of land heretofore covered with an extensive sheet of stagnant water, known by the name of *The Drowned Lands*. This has, of late years, been partly drained by commissioners authorized by law to open aqueducts at the outlet into the Wall kill. Their enterprise has been reasonably successful, and the general opinion of the best informed men, seems to be, that their labours will be ultimately crowned with success. In this event a tract of between twenty and thirty thousand acres of land will yield to the proprietors a rich reward for their agricultural labours.

Within the precincts of the country here described, there are also many curious and valuable productions ; Ochres of various colours and qualities are found in the neighbouring mountains, and in the environs are great quantities of iron and other ores ; chalybeate springs and other mineral waters are also very common.

It will be seen from this succinct account of the country, that whether the mammoth delighted in the fertile plain, in the low and sunken meadow, or swamp ; or in the lofty and craggy mountains, or in all of them, the variety of the soil

and formation of the country, afford a gratification to all his natural inclinations and propensities.

I do not, however, know that the marl discovered in abundance in Ulster and Orange counties has been found in their neighbourhood ; and it is proper to remark, that in these sunken receptacles of vegetable and testaceous solutions, have uniformly been found the bones of the mammoth. Perhaps it may be said, that in this marl, by its alkaline qualities, has the preservation of these fossils alone been preserved from dissolution and decay. The formation of these has evidently been the work of ages. In many places the body of this manure is thirty feet in depth ; over which grass and vegetable plants, interspersed with trees of different kinds common to such grounds, grew in abundance. In these places are uniformly found living springs, and abundance of snails and muscles, which, with vegetable substances, constitute the marl of different colours and, (in some respects) qualities.

It may not be improper here to add a few remarks on the subject of this natural manure, which sooner or later cannot fail to be a source of wealth to the agriculturalist. The use of it has heretofore been superseded by the introduction of gypsum, on account of the cheapness of the latter ; but interruptions of commerce have already very considerably enhanced the value of this article ; and the distance of transportation of that discovered in the western parts of this state, must necessarily put it at a price much higher than usual to our farmers.

The marl here discovered is constituted principally of the solutions of small shells of the muscle and of the snail families ; it is mixed with a proportionate quantity of vegetable substances, such as leaves, roots, &c. which find their way by the winds into the waters of these swampy, wet places : these sink to the bottom of the water, and the snails and muscles deposite their ova or sperm upon them ; and the returning spring, by its genial warmth and natural process brings them forth. They grow for the season, and in the autumn again deposite their ova or sperm upon the fragments of vegetables, which find their way into these watery habitations. I do not know what the theory of conchologists may be, as to the procreation of these shellfish ; nor am I at all versed in this kind of natural history ; but taking the facts as I have witnessed them, I feel authorized to give this as a theory resulting from actual and personal observations. If a better can be offered by others, I am contented ; but, until then, I trust it may be insisted that this is a reasonable explanation of the formation of marl. By this theory it will be perceived that the quantities of marl are continually increasing ; a fact of great importance to the inhabitants and owners of the soil. It may be proper to mention, also, that this marl lies in different places in the vicinity of the depositories of these bones ; and that, as yet, little use has been made of it as a manure ; the high price of labour has hitherto prevented the farmer from having recourse to this source of

wealth, while he could enrich his lands so much more readily and cheaply by the use of plaister of Paris or gypsum, as before explained. Within a circle, the *radius* of which does not exceed six miles, there are several hundred acres of marl; a very small proportion of this has been explored or dug to the bottom, where the fossil bones have uniformly been discovered. By the force of their own weight, they have naturally sunk through the soft substance and found rest many feet below, on solid or harder ground. And yet within the periphery of this circle, *nine* skeletons of these prodigious animals have been discovered! It may certainly be safely computed, that not one hundredth part has been explored to the bottom. If then, so many have been found in so small a proportion of this *mammoth* ground; and admitting that there has been great *good fortune* in falling upon their place of rest, does it not afford a most reasonable hypothesis to say, that there are vast numbers of these natural curiosities deposited here for future discoveries; and that at some period our country (in this district) was fully inhabited by this stupendous animal.

The discoveries being altogether in a particular kind and character of ground afford reasonable inferences as to the nature and appetites of the animal. The formation and the quantities of marl and other productions, furnish also interesting calculations in chronology.

Anterior to the substances and productions now occupying these places, they have been covered by sheets of stagnant waters. These have afforded a variety of herbage and grass, which delight in water and wet soils and have abounded in different species of shell and other fishes. The various *genera* and *species* of amphibious animals, which were known to have been common to an uninhabited or uncivilized country, have had their residence in these tracts of wild and savage wildernesses.

The graminivorous, or carnivorous, appetites of the non-descript could have found an early or rich repast in these particular places; where the voracious cravings of hunger may have urged him in the pursuit, arrested by quagmires, and terminating in death!

My reflections on these subjects may appear chimerical and visionary; but a full knowledge of the facts I relate, careful and candid reflections, under all the circumstances accompanying these phenomena, have led me to a firm and unalterable opinion, that these animals were once common in this country; that in numbers, they equalled the other beasts of the forest; such as the bear, the wolf, the panther, &c. &c. in the proportion which larger animals bear to the smaller, in the order of nature. Should my opinion be reasonable, and founded in fact, it leads the mind to a variety of astonishing and curious results!

Why, in the dispensations of an overruling providence, should these animals once have been created, and existed in vast numbers, now be extinct? or, at all

events, expelled from any known region in our country? this becomes a question still more interesting if we suppose the animals to have been carnivorous. That they were so, as well as graminivorous, is pretty well authenticated, by the formation of their grinders. Perhaps, to say they were *omnivorous*, would not be hazarding too much. Indeed, my worthy and learned friend, dr. James G. Graham, who examined the fossils, went still further; for the formation of the bones, near, and belonging to the foot, warranted him, as a professional man, in the belief that this animal had claws.

I am aware, that an opinion so singular as this entertained by my learned friend, dr. Graham, forms an anomaly in nature; but from a careful examination of the bones of the foot, the metatarsal bones (as they are termed in anatomy) were so constituted that the doctor drew his conclusions of their appertaining to a *clawfooted* race of beasts. Nor is this opinion more strange than their actual existence. For, whether they are of a genus of animals now unknown,—whether of the elephantine family,—of the asiatic or siberian species; the solution of their existence, upon any certain knowledge, is equally difficult and inexplicable.

From this narrative, you will be enabled to possess yourself of some information on an interesting subject, which could not be well or accurately obtained, except by viewing the topography of the country, and witnessing the taking out of the skeletons; this not being practicable for you in your various literary and official pursuits, I have thought a circumstantial narrative worthy of your enlightened consideration.

This subject has been a source of conversation and inquiry amongst men of information and has led to different speculative opinions. My friend, the erudite dr. Mitchill, appears to have struck upon a philosophical explanation, which is at once bold, and will explain the phenomena. By his reflections he places these curiosities amongst *elephantine relics*; occasioned by the change of the axis of the globe ninety degrees, at some very remote period. By this hypothesis may be also explained the existence of these bones and bodies of animals, belonging to low and warm latitudes, being found in the cold and frozen climates of the earth. That gentleman supposes the ancient equator to have extended, in the northern hemisphere, from the bay of Bengal, near where the mouth of the Ganges are through Thibet, Tartary, and Siberia, to the present North Pole, and thence along in North America through the tracts west of Hudson's Bay and Lake Superior, to the sources of the Mississippi, and thence down to the Gulf of Mexico, near its places of disemboquement, and so onward across New Spain to the South Sea. That such was probably the old equatorial line.

In corroboration of this gentleman's opinion, he truly alleges, that under the ancient equator have been found the remains of animals peculiar to warm cli-

males; the bones of the elephant and the rhinoceros are discovered almost all the way where he would designate the ancient equator; that in colder latitudes the frozen bodies themselves on the banks of the Genesee and the Lena and in masses of ice lying upon the shores of the asiatic continent, and thereabouts, have attracted the attention of the naturalist; that in America, the valley of the Mississippi was the place of the former equator, in which direction the fossil skeletons are most frequent, and that the creatures to whom they belong, may be supposed to have perished at the grand catastrophe in their proper and natural climates; that the migration of the human race, and the passage of animals from Asia to America, find a solution by this theory of easy and rational comprehension.

Dr. Mitchill descants largely and philosophically upon the causes of this change; but as these remarks would be too voluminous to insert here, I shall forbear to enlarge further on a subject involving so many considerations necessary in the examination of the causes and effects producing such vast geological phenomena.

This hypothesis of dr. Mitchill will easily and readily explain the phenomena of these, as well as of others found in our northern and some southern regions. And if we can admit that these skeletons are nothing more than elephantine relics of a well known, or even an unknown, species; the difficulties now presenting themselves disappear. For my own part, I have reasoned myself into a different opinion; but, after all, the fact must remain encompassed with so many doubts and difficulties as to perplex the learned and curious.

It is important also to add, that with the discoveries of these skeletons have been found considerable locks and tufts of hair: having been buried a great length of time in a calcareous substance, it retained its natural appearance, and was brought to light in a tolerable state of perfection; the length was from one and a half to two inches and a half, of a dunish brown colour. In one instance the hair was much longer, measuring from four to seven inches in length; of the same colour and resembling, in appearance, the shorter and was conjectured to have been the mane of the mammoth. Whether a discoloration had not taken place, from its native appearance, must remain a matter of conjecture. In every instance, an exposure to air caused it to moulder away into a kind of impalpable dust. This fact would seem to render it certain that the animal, the relics of whose body were here found, appertained to a race totally different from any elephants now known to naturalists.

Having thus detailed to you the information, as far as is practicable in the form of a letter, permit me to congratulate you on the prospect which is opening for scientific research in our state. Much has been done to elevate the character of our beloved country; but it is certainly not saying too much to observe that

the field of enterprise and research, yet unexplored, is widely expanded and requires the unremitting attention of profoundly learned men, farther to develop the occult treasure of natural history. Under your auspices, and the learned gentlemen associated with you, I trust public expectation will be fully realised from the discoveries of "the Literary and Philosophical Society of New-York."

Permit me, in concluding this letter, to renew to you the considerations of my best esteem; with a wish that the friendly intercourse which has so long and sincerely existed between us, may continue until separated by that event which awaits us all.

Your very obedient and humble servant,

SILVANUS MILLER.

The honourable De Witt Clinton,

President of the Literary and Philosophical Society of New-York.

New-York, October, 1814.

NOTE 14.

The white-brown, or grizzly bear, is of all colours; from a brown to almost a perfect white. It is much taller and longer than the common bear; the belly is more lank. It runs much swifter, and its claws, tusks, and head, are much larger and longer, and it has a large tuft on the back of its neck. One was shot on Lewis and Clarke's expedition, which weighed between five and six hundred pounds at least; and measured eight feet seven inches and a half from the nose to the extremity of the hind feet; five feet ten inches round the breast; three feet eleven inches round the neck; one foot eleven inches round the middle of the fore leg; and his talons, five on each foot, were four inches and three-eighths. Its talons are much longer and more blunt than those of the common bear; its tail shorter; its hair longer, finer, and more abundant; its liver, lungs, and heart, much larger, even in proportion to its size; the heart particularly, being equal to that of a large ox; its maw ten times larger; its testicles pendent from the belly, and in separate pouches, from two to four inches asunder; whereas those of the black bear are situated back, between the thighs, like a dog's; its track in the mud or sand has been seen sometimes eleven inches long, and seven and a quarter wide, exclusive of the talons. It is principally carnivorous, and will generally attack a man whenever it sees him. These animals are numerous, and their tenacity of life is wonderful. No wound except through the head

er heart, is mortal; and they have even escaped after being shot in several places through the body. The indians never attack him but in parties of six or eight persons; and even then are often defeated with the loss of one or more of the party; and when they go in quest of him, paint themselves, and perform all the superstitious rites customary when they make war on a neighbouring nation. The indians say these bears have killed a number of their bravest men. On Lewis and Clarke's expedition, they frequently attacked the hunters; and captain Lewis himself was chased by one of them, and escaped only by plunging into a river. One of Lewis and Clarke's men shot one of them through the lungs; it nevertheless pursued him furiously half a mile, and he was only relieved from his danger by captain Lewis and seven men, who followed the bear by his blood a mile, and killed him; he had, with his talons, prepared himself a bed in the earth two feet deep and five feet long; and was perfectly alive when they found him, which was at least two hours after he received the wound. (*Transactions of the American Philosophical Society, vol. 6. Gass's Journal. Lewis and Clarke's expedition up the Missouri, vol. 1.*) Dixon, the indian trader, told a friend of mine that this animal had been seen fourteen feet long; and that notwithstanding its ferocity, it has been sometimes domesticated; and that an indian belonging to a tribe on the head waters of the Mississippi had one, in this reclaimed state, which he sportively directed to go into a canoe belonging to another tribe of indians then about returning from a visit; the bear obeyed, and was struck by an indian; being considered one of the family, this was deemed an insult, was resented accordingly, and produced a war between these nations. The reverend John Hechewelder states, that the mohican indians had a tradition of an animal called the big naked bear. They say that the last was seen on the east side of Hudson's river, where the indians killed him after great difficulty; that it was remarkably long bodied, and larger than the common bear; all over naked, except a spot of hair on its back, of a white colour; that it was very destructive to their nation, killing and devouring them. And such was the terror it inspired, that they often say to their children, when crying, "Hush, the naked bear will hear you, be upon you, and devour you." This account agrees, in general, with the grizzly bear; and particularly in the dimensions of the animal, its appetite for human flesh, and its terrific character. There is nothing in our climate which forbids this hypothesis. (*American Philosophical Transactions, vol. 4.*) It was a long time supposed that this animal was the *ursus arctos* of Linnæus, and he is so characterized in the 6th volume of the Philosophical Transactions before referred to. I am sorry to say, that such is the low state of natural knowledge among us, that dr. Belknap the inestimable historian of New-Hampshire, has even represented our common bear as the *ursus arctos*. (*Vol. 3.*) Bossu, in his travels in Louisiana, says they have

"white bears whose skin is very fine and soft." (Vol. 1.) Forster, the learned translator, says, in a note, "This cannot be the great polar bear, as this latter is only to be met with in the most frigid parts of our globe; and the soft hair, here mentioned, will not admit to think of the polar bear whose hair is like bristles." Notwithstanding this significant intimation, they have been generally confounded together. Whether this animal is a native of Europe and Asia, I cannot distinctly say; but from the descriptions of Pennant, (*Arctic Zoology*, vol. 3.) I should suppose that it is. He says, that there are land bears in the north of Tartary, entirely white and of a very great size; and that the grizzly bears, (which are called by the Germans *silber bar*, or the *silver bear*, from the mixture of white hairs) are found in Europe, and in the northern parts of North America, as high as latitude seventy; where a hill is called after them, Grizzly-Bear-Hill.

Upon the whole we may, with propriety, say, that the *bear proper* consists of four distinct species:

1. The polar bear.
2. The grizzly bear.
3. The common bear of Europe.
4. The common bear of America; which is also said to be of two kinds, or, in all probability, mere varieties.

I lay no great stress upon the surmise that the grizzly bear and Mr. Jefferson's *great claw*, are the same animal. They agree pretty well in the dimensions and character of the claw, and in the general size; but the correctness of the hypothesis must be determined by a comparison of the bones.

NOTE 15.

Although Buffon seems to have, at one time, adopted this opinion yet he afterwards retracted it. In one place (vol. 3. p. 458.) he says, "the domestic ox, which ought not to be confounded with the urus, the buffalo, or the bison, seems to be a native of our temperate climates; excessive heat, or excessive cold, being equally hurtful to him. Besides, *this species*, so abundant over all Europe, is not found in the equinoctial regions," etc. In another place, after a long chain of ingenious and learned deduction, he arrives at this conclusion: "Thus the wild and domestic ox of Europe, Asia, Africa, and America, the *bonasus*, the *aygochs*, the bison, and the *zebu*, are animals of the *same species*, which, accord-

ing to the differences of climate, of food, and of treatment, have undergone the various changes above described." (*vol. 6. p. 188.*) Pennant is equally decided : "The bison and aurochs of Europe is certainly the same species with the american ox. The difference consists in the former being less shaggy, and the hair being neither so soft nor so woolly nor the hind parts so weak. Both european and american kinds, scent of musk. In ancient times they were found in different parts of the old world, but went under different names : the bonasus of Aristotle, the urus of Cæsar, the bos ferus of Strabo, the bison of Pliny, and the biston of Oppian, so called from its being found among the bistonæ, a people of Thrace. According to these authorities, it was found in their days in Media, and in Pæonia, a province of Macedonia ; among the Alps, and in the great Hercynian forest, which extended from Germany even into Sarmatia. In latter days a white species was a native of the scottish mountains ; it is now extinct in its savage state ; but the offspring, sufficiently wild, is still to be seen in the parks of Drumlanrig, in Scotland, and of Chillingham castle, in Northumberland.

In these times it is found in very few places in a state of nature : it is, as far as we know, an inhabitant, at present only of the forests of Lithuania among the Carpathian mountains within the extent of the great Hercynian wood, its ancient haunts, and in Asia, among the vast mountains of Caucasus. *Arctic Zoology, vol. 3.*

According to these opinions, the Linnæan name of our buffalo, or american wild ox, is *bos bison*, or *bos bonasus* ; and that of the indian buffalo, is *bos bubalus*. The latter originated in Egypt and India, and is very numerous in all the warm climates of the old world ; especially in marshy countries, and in the neighbourhood of rivers. Water and a moist soil seems to be still more necessary to them than the warmth of climate. It was transported and naturalized in Italy about the end of the seventh century, and is now in France. It is used for drawing, and is directed and restrained by means of a ring passed through its nose. Two buffaloes yoked, or rather chained, to a carriage, draw as much as four strong horses, as they carry their neck and head low, and the whole weight of their body is employed in drawing, and their mass much surpasses that of a labouring horse. They are used for ploughing throughout Italy, are hideous animals, with very coarse black hair, and have a singular swinging motion of the head, in walking. The milk is not so good as that of the common cow, but is much more plentiful. A kind of cheese is made of it called *fimaggio di cavallo*, or horse cheese, but nevertheless very good. Its flesh is not so good, but it is larger and stronger than the common ox. *Buffon, vol. 6. Smith's Sketch of a Tour, etc. vol. 2.* The *bos bubalus* is an entire distinct species from the american buffalo ; the period of its gestation is twelve months ; whereas that of the american bison and domestic cow is nine. It will have no connexion with them ;

whereas they breed together. If the climate of this state is not sufficiently warm for this useful animal it will, no doubt, flourish in the southern states.

The young of our buffalo, or bison, have been repeatedly put among the tame cattle at Quebec; and, after exhibiting, on all occasions, symptoms of their original wildness have commonly died in a few years. It is supposed that the climate is there too cold for them. This difficulty cannot exist here. Before the cultivation of the country they were in immense herds in the western parts of the state, frequenting the salt licks, and roving over the wide-spreading luxuriant prairies of the Genesee, and they have given their name to a celebrated stream which runs into Lake Erie near its outlet. It has been domesticated in South Carolina, but appears to retain some of its primitive wildness.

Van der Donk informs us that the buffalo was frequently found in the southern part of New Netherland, and that there are some individuals who domesticate it for their amusement, and being accustomed from its youth to associate with man, it will become remarkably tame, and not readily return to the forest. The male does not depreciate by castration, nor do male or female degenerate by associating with tame cattle; but, on the contrary, both are improved. It is believed that crossing the buffalo with the cow will produce a breed of increased value for the yoke, for the dairy, and for the market; the buffalo, even in its wild state, being naturally strong, yielding excellent milk, and inclined to fatten.

He proceeds to state that there are deer, both bucks and does, of a pure white colour; and that the mohawk indians have told him that very far in the heart of their country, there existed large beasts of the form, and above the size, of a horse; whose hoofs were divided, and whose forehead was ornamented with a single horn, of about the length of twelve or eighteen inches; whose swiftness in running, and strength, were so great, that they were taken with the greatest difficulty. "I have never," says he, "seen this animal; but that it does exist I do not doubt for a moment; for the indians universally affirm it, and the christians declare they have seen, in the market, hides with but one horn."

If this account is not fabulous, this was probably the elk seen after he had shed his horns, and when the young ones were sprouting; but if not, then a race of unknown animals must have, in former times, existed in this state; which is now extinct.

It seems, then, that there are three kinds of the animal denominated *bos*; all susceptible of domestication, and all highly useful to man.

1. The *bos indicus* or *bubalus*, or asiatic and african buffalo.
2. The *bos bison*, or american buffalo.
3. The *bos taurus*, or domestic ox. The two last, probably, varieties of the same species; and, at all events, specifically distinct from the first.

NOTE 16.

PENNANT, Forster, Buffon, and indeed all the european naturalists, are positive that our moose is the elk. "The name, says Pennant, is derived from *musu*, which, in the algonquin language, signifies that animal. The english used to call it the black moose, to distinguish it from the stag which they named the gray moose. The french call it original." On comparing the animals called moose and elk, in this country, we find, at once, a specific difference in their size, their colour, their horns, and their residence; and a great difference in every other respect, except their being of the genus *cervus*. We are then certain, that the moose is not the animal denominated by us, the elk; but the question still remains open, whether the moose is not the elk, or *cervus alces*, of Europe, described by Linnaeus as having palmate horns, with short or no beams, and garunculate throat. They certainly assimilate in many respects.

Another question still remains for decision; whether the animal, which we call the elk, is the elk of Europe. I think there can be no hesitation in saying, that it is not. Charlesvoix says, that the canadian stag is precisely the same as that of France; and Buffon says, that it is only a variety of the european stag or hart; that it differs from it in length of horn only, and in the direction of the antlers, which is sometimes not straight, as in the common stag, but turned backward so that the end of each points to the stem of the horns. *Buffon. vol. 4.*

Catesby gives the following account of these animals, which appears to be very judicious and correct. "The moose, or elk, *alce maxima americana nigra*, is a native of New England and the more northern parts of North America; and is rarely seen south of latitude forty, and consequently never in Carolina: he is six feet high, about the size of a middle sized ox. The male has palmated horns, not unlike those of the german elk, but differs in having branched brow antlers. The stag of America resembles the european red deer, in the colour, shape, and form of the horn, though it is a much larger animal and a stronger make; his horns are not palmated, but round; a pair of which weighs upwards of thirty pounds; they usually accompany buffaloes with whom they range, in droves, in the upper and remote parts of Carolina, where, as well as in our other colonies, they are improperly called elks. The french, in America, call this beast the canadian stag. In New England, it is called the gray moose, to distinguish it from the black moose." *Natural History of the Carolinas, vol. 1.*

Pike saw plenty of these animals on the Mississippi, sometimes the distance was four feet between the horns, and one hundred and fifty of them were frequently in a flock. Pennant says, that stags abound in the mountainous south,

ern tract of Siberia, where they grow to a size far superior to what is known in Europe. The height of a grown hind is four feet nine inches and a half, its length, eight feet, that of its head, one foot eight inches and a half. *Arctic Zoology*, vol. 3.

Mr. Jefferson, in his notes on Virginia, says, perhaps it will be found that there is,

1. The moose, black and gray ; the former being said to be the male, the latter the female.
2. The caribou or renne.
3. The flat horned elk, or original.
4. The round horned elk.

The black moose and the third, are the same animal ; and the gray moose and the fourth. The moose has large flat palmated horns ; our elk has round cylindrical horns. The former is confined to the regions of the north ; the latter extends itself from Canada to the south.

The animal called caribou in Canada is the rein deer, or *cervus tarandus*, of the old world. Buffon says, that the elk is found only on this side, and the rein deer beyond the polar circle in Europe and Asia. In America, we meet with them in lower latitudes ; because there the cold is greater than in Europe. And, he says, that this animal formerly existed in the forests of Gaul and Germany ; if so, there is no improbability in supposing that he formerly visited us in search of his favorite food the rein deer moss.

From the chaos which has existed on this subject, we may extricate order and light ; and I think we are well warranted in saying,

1. That the animal which we call the elk, is not the *cervus alces* ; but that it is either a variety of the stag, red deer, or hart of Europe ; the *cervus elephas*, or a distinct species of *cervus*.

2. That it is not the moose, and that the moose, according to the opinion of the most eminent naturalists, is a variety of the *cervus alces*.

And, 3. That besides these two animals, we have the rein deer, or *cervus tarandus*, of the old world, called with us the caribou.

Buffon says, that the *cervus virginianus*, is only a variety of the *cervus dama*, the common or fallow deer of Europe.

Have we any other species of *cervi* ?

Have we the roe deer, or *cervus capreolus* ? Buffon says it is found throughout all North America.

Have we the red deer, *cervus elephas* ? Jefferson says that it is an american animal, and that it weighs two hundred and seventy-three pounds.

What animal is that called by Lewis and Clarke in their *Travels*, the male deer ?

A young moose has been lately exhibited at Albany as a show. It is hoped that some of the scientific gentlemen of that city have directed their particular attention to it.

NOTE 17.

The able editors of the American Medical and Philosophical Register, knowing my partiality for this distinguished naturalist, requested me to write a review of the five last volumes of his American Ornithology. This request I complied with, although fully sensible of my unfitness for the task. As this review contains a full statement of my view of mr. Wilson's great work, it may not be improper to insert it in this note.

[From the American Medical and Philosophical Register, vol. 4.]

AMERICAN ORNITHOLOGY; or the Natural History of the Birds of the United States: illustrated with plates, engraved and colored from original drawings taken from nature. By ALEXANDER WILSON. Philadelphia. Inskcep & Bradford. Imperial 4to, vols. 5th, 6th, 7th, 8th, and 9th. About 120 pages each: 1812-14.

THE author of the American Ornithology having closed his earthly career before he finished that important work, the task of completing the ninth and last volume, devolved upon his friend and executor, mr. George Ord, who has prefixed to it an interesting biography of mr. Wilson. Having, on former occasions, noticed several of the volumes, it now remains for us to pay the last tribute of respect to a man whom we esteem, and to an author whose works will always occupy an important rank among the writings on Natural History.

The life of mr. Wilson exhibits the complete triumph of genius over the want of education, and of persevering industry over the evils of poverty. Without any other reliance than on his own faculties, and with a force of exertion which nothing could check or retard, he has obtained a celebrity in science to which few men, in this country, can aspire; although many may be more highly favored with the endowments of genius, and more extensively gifted with the advantages of early education, and the bounties of fortune. The life of Wilson shows, conclusively, that the temple of fame is open to the most humble individual in the community, if he only attempts it with zeal and industry and with a judicious selection of the part which he intends to act on the theatre of the world: and it may not be amiss to add, in opposition to the complaints of his biographer, that notwithstanding he experienced, in some few instances, the slights of ignorance, and the sneers of impertinence, yet that a liberal and enlightened.

community bore witness to his merits by a munificent subscription which, after satisfying all expenses, would have placed him, if living, on the enviable ground of independence.

The science of ornithology is involved in considerable difficulty and confusion. The arrangement of animals according to the principles of the Linnæan system, is an admirable contrivance to extricate the science of zoology from the darkness which surrounded it. The classes and orders of the great naturalist are arbitrary: the genera and species are natural; but when we consider that the generic characters of birds are taken from the bill, tongue, nostrils, cere, earuncles, and other naked parts—and that the characters of the species are derived principally from the plumage and habitudes, we must be sensible that here is a wide field for a difference of opinion. Besides, the nomenclature adopted, in endeavouring to compress the descriptions of animals within the shortest compass, is frequently a mystery to most readers. Take, for instance, an account of a bird by Linnæus, Latham, or Pennant, and it will require considerable industry to penetrate the exact meaning of the author. The generic characters frequently run so closely into each other, that it is no easy task to make the appropriate arrangement. The plumage of birds varies according to seasons, to age, and to climate; and their manners assume a different appearance at different times, and in different countries. The sexes exhibit, almost invariably, a diversity. The male is frequently smaller than the female, and is generally arrayed in a more beautiful dress. Genera are confounded together; varieties are represented as distinct species; the male is placed in a different species from his mate; and the same bird, at different ages and seasons, is considered a different species. The names of birds vary in different places.

In the same district of country the same bird frequently goes by different appellations, and the scientific name is also not uniform; Linnæus, Brisson, and Buffon, oftentimes disagree. We may add to this, the absurd custom adopted in this country of naming our birds after those in Europe, to which they are supposed to have some likeness, although, in most respects, they are dissimilar.

There are three modes in which we may obtain a knowledge of birds. From personal observation of these animals in their natural state; from preserved subjects in cabinets of natural history; and from books. The first is undoubtedly preferable, so far as it goes; but it is necessarily limited by our range of travelling. The second supplies this defect, but it is liable to this great objection; the subjects are often not only imperfectly prepared in the first instance, but generally decay and dissolve. In Cayenne, which has furnished more subjects for the cabinets of European naturalists, than any other country; the birds are steeped in spirits for a long time, and dried by the heat of an oven. This must undoubtedly, in many instances, sully the glossy beauty of their plumage, and

give them an appearance different from their natural one. Books must be resorted to in order to complete and extend our knowledge; but to place our sole reliance on them, would be as absurd as to attempt to attain a knowledge of mankind by the meditations of contemplative retirement.

Our author has, with unparalleled industry, and singular sagacity of observation, surmounted all the disadvantages which we have enumerated, and availed himself of all the sources of information: every state in the union has witnessed his labours: on our alpine hills; in our most distant forests; on the borders of our rivers and lakes; on the shores of the Atlantic, the footsteps of his enterprising industry may be seen. He first examined the feathered creation with his own eyes; he traced them in their most secluded haunts; he watched their migrations; he observed their seasons of song, and of love, and of incubation; he noticed their food, their instinct, and their habits.

After having explored this source of information, he next had recourse to cabinets of natural history, to the aviaries of amateurs, and to the observations of inquisitive and ingenious men. The museum of Peale furnished him with various and extensive knowledge; the methodical and comprehensive writings of Linnæus; the extensive information of Pennant, Brisson, Edwards, and Latham, and the splendid elucidations of Buffon, were also familiar to him.

Thus furnished with information, he has produced a work which excels all that precedes it, whether we have reference to the style and matter, or the drawings. It is in vain to attempt to form ideas from written descriptions of animals, sufficiently distinct, so as to distinguish them in all cases from each other: we must have recourse to the delineations of the pencil, and to the preservations of the museum. The number of species of birds has undoubtedly been greatly multiplied from the generality and confusion of descriptions; let the same bird be described after the Linnaean manner by two different persons, and it is an equal chance if they do not vary in some essential respects; but a faithful representation of the pencil will at once remove all ambiguity. The delineations of Wilson are done in such a masterly style, that the bird is at once recognised. He also excels in his account of the manners of birds: although he cannot boast of the splendid eloquence of Buffon, yet there is such a fascination in his style, such a simplicity in his manner, and so much truth and nature in all his remarks, that we are compelled to give him the preference.

To form a just estimate of the extensiveness of this work, we have only to compare it with the celebrated natural history of Mark Catesby, published in 1754. Although the drawings of this writer are eminently beautiful, and generally correct, yet they are greatly inferior to those of Wilson. His descriptions also will not bear a comparison, either in interest or extent: the whole number of birds which he describes amounts to 113, which contained all the land birds

he saw in North America, between the 30th and 45th degrees of latitude. Wilson has figured and described 278 species, 56 of which were not known before: his untimely death has prevented the full execution of his plan. The swan, the turkey, and the crane, the most interesting of the feathered race, did not come under his review; a loss that cannot be supplied. With what interest would we read his remarks on the turkey? What light would he not have cast upon those controverted questions, whether the turkey is of exclusive american origin? and whether the domestic is a distinct species from the wild turkey? and whether, contrary to the general operation of cultivation and domestication upon animals and plants, this bird has dwindled in size, and sustained a deterioration by its domestic state?

Although Wilson has done much, yet much more remains to be done, in order to complete our ornithology. The whole number of species, according to Latham, is three thousand. Considering that the american republic, including our Louisiana acquisition, extends from the Atlantic to the Pacific, embraces the greatest and most spacious inland seas in the world, comprehends every variety of climate and soil, innumerable and boundless forests; prairies, or natural meadows, of several days journey; deserts like those of Africa; mountains dividing the country into an eastern and western section; and rivers equalled in size by none in the old world: considering also its vicinity to numerous islands of a warm temperature, and the approximation of America to Europe and Asia, by which the land birds of the old world can have easy access to our continent: it is not unreasonable to suppose, that we may claim at least one thousand species of birds, who either reside among us, or occasionally visit us. If this calculation be correct, what an extensive field yet remains for the ornithologist? and if another Wilson shall arise, endowed with genius and invincible industry, the rich treasures of natural science, which are now hidden from our view, will be drawn from the darkness which covers them, and exposed to the full view of an admiring world.

NOTE 18.

It would occupy too much ground to state the various difficulties which perplex the naturalist in this interesting study. The greatest embarrassment exists with respect to the identity of the species, and this proceeds from the application of the names of european birds to ours which are entirely distinct; from the imperfect, indistinct, and general descriptions of ornithologists; from an inat-

tentative observation of the changes which take place from age, from climate, from season and food, and from the great difference which nature has established between the sexes. It has, until lately, been doubted whether the bald eagle and the sea eagle were the same; and the same difficulty has occurred in relation to the whippoor-will and the night-hawk. This is now considered as settled. The latter are supposed to be distinct species, and the former are the same birds under different appearances of plumage.

An interesting discussion has been had upon this question, whether the turkey is exclusively of american origin? Thomas Pennant published, in the Transactions of the Royal Society, a paper to show that the turkey came from America, and was unknown before the discovery of that continent. Daines Barrington, who has taken the opposite side of the question, asserts that this fine bird boasts an eastern origin. According to a distich in Baker's Chronicle, turkeys were introduced into England from Spain. Latham, in his Synopsis of Birds, says, that turkeys were brought into England about 1524, and that they unquestionably came originally from America, and are found largest in the northern parts. Bartram, in his travels through the Carolinas and Floridas, represents "our turkey as a very different species from the meleagris of Asia and Europe; they are nearly thrice their size and weight; they are taller, and have a much longer neck proportionately, and likewise longer legs and stand more erect; they are also very different in color, they are all of a dark brown color, not having a black feather on them; but the male is exceedingly splendid with changeable colors." Michaux, in his Travels to the westward of the Alleghany Mountains, &c. says, "To the east of the Mississippi in a space of more than eight hundred leagues, there is only one species of wild turkey. Some weigh thirty-five or forty pounds. The variety of domestic turkeys to which the name of english turkeys is given in France, came originally from this species of wild turkey, and when they are not crossed with the common species, they retain the primitive colour of their plumage as well as that of their legs, which is a deep red. If subsequent to 1525 our domestic turkeys were naturalized in Spain, and from thence were introduced into the rest of Europe, it is probable that they were originally from some of the more southern parts of America, where they doubtless exist a species different from that of the United States."

Notwithstanding the authoritative decisions of the two last quoted writers, I think we may venture to dissent from them, and to say that the wild and tame turkeys are only varieties of the same species. It is well known that they breed together, and that their offspring are also productive. The only difficulty, then, is respecting their size and plumage; all animals are changed by domestication. Their color, in a wild state, is generally uniform and similar; but when tamed, it changes into a number of varieties. The mallard is the

stock from whence our domestic duck proceeds, and the gray lag is the origin of the domestic goose. The color of these birds, in their reclaimed condition, is various; in their wild state it is uniform. The turkey when domesticated is exposed to the same mutations. As to comparative size, it may be observed, that the largest wild turkey does not exceed the largest tame turkey one half in weight; and this may also proceed from domestication. If the bison is the original stock of our tame cattle, has not the latter diminished in magnitude by the change? but this diversity may, perhaps, be satisfactorily accounted for in another way. The turkey was introduced into Europe from Spain, and Spain derived it from her tropical colonies. It is a bird which flourishes best in temperate climates; as it extended its migrations too far to the south, it diminished in size: although the identity of species could not be changed, yet a variety was produced of inferior magnitude. From the spanish turkey, which was thus spread over Europe, we have obtained our domestic one. The wild turkey has been frequently tamed, and his offspring is of a larger size.

Considerable doubts have also been suggested with respect to that interesting bird called the rice bird, reed bird, or bob lincoln, (*emberiza oryzivora*). I call it interesting on account of the beauty of its plumage, the melody of its notes, and the delicacy of its flesh, which induced Brisson to call it *Portolan de la Caroline*. Its migrations have been represented as composed of each sex distinctly. Catesby first suggested this idea. "In September," says he, "when the rice birds arrive in Carolina, in infinite swarms, to devour the rice, they are all hens, not being accompanied with any cock. Observing them to be all feathered alike, I imagined they were young of both sexes not perfected in their colors; but by opening some scores prepared for the spit, I found them to be all females; and that I might leave no room for doubt, repeated the search often on many of them, but could never find a cock at that time of the year. Early in the spring both cocks and hens make a transient visit together, at which time I made the like search as before, and both sexes were plainly distinguishable. In September, 1725, lying upon the deck of a sloop in a bay at Andros' island, I, and the company with me, heard three nights successively flights of these birds, (their note being plainly distinguishable from others,) passing over our heads northerly, which is their direct way from Cuba to Carolina; from which I conceive, after partaking of the earlier crop of rice at Cuba, they travel over sea to Carolina for the same intent, the rice there being at that time fit for them." *Natural History of Carolina, Florida, and the Bahama Islands*, vol. 1.

Bartram seems to have adopted the same opinion, but with some hesitation. "It is (says he) the commonly received opinion, that they are male and female of the same species, i. e. the black-pied rice birds the male, and a yellowish

clay-colored one the female; the last mentioned appearing only in autumn, when the *oryza zizania* are about ripening; yet, in my opinion, there are some strong circumstances which seem to operate against such a conjecture, though generally believed."

About the middle of May, the black-pied rice bird, called the male, appears in Pennsylvania, about which time the great yellow ephemera, called May fly, and a species of locustæ; appear in great numbers, the favorite food of these birds. *Travels in South Carolina, vol. 1.*

Dr. Barton states, that the rice bird makes its appearance, near Philadelphia, about the 20th of May, and that the females exclusively make their appearance about the 20th of August. "On the authority of Catesby," says he, "it has been believed by the most respectable naturalists, (Pennant and others,) that the males and females migrate separately at different seasons. Thus it is imagined, that the males make their appearance in the vicinity of Philadelphia in the spring, and the females in the autumn, or close of summer. Some facts which have come under my knowledge, induce me to suspect, that this is a vulgar error; one of the many mistakes with which natural history is crowded and deformed, but at present I can only throw out the suspicion." *Fragments of Natural History.*

Although these supposed separate sexual migrations may be considered anomalous, yet they are not without precedent: The male cuckoo arrives in England before the female. The male of the motacilla lusciniæ, or nightingale, arrives there about a week after the female. The male of the *sylvia sylvicola*, or wood wren, precedes the female in its vernal migrations to that country, a week or ten days. And what is still more extraordinary is, that we have the authority of Linnæus for saying, that the female chaffinches of Sweden, (*fringilla cælebs*,) migrate only, and this assertion is confirmed from seeing only females of that species, in certain parts of England, at that time. And to show an instance of a peculiar exception from a general rule, we have only to advert to the arrival of some birds into Great Britain against a strong wind.

We all know that the notion of the arrival of the different sexes of this bird, at different times, in this part of the country is unfounded. They arrive on Long Island sometime in May, and have their young in June, when the distinction of sexes in the young, as well as old, is obvious, the young males resembling the old ones; and they are, at that season, brought alive to our markets, by the bird catchers, for sale, and sold to be kept in cages. They retire from us the latter end of the summer, at the same time; but the positive assertion of Catesby, and others, that females are only seen in Carolina in September, and that he had verified this opinion by dissection, was calculated to produce acquiescence, until Wilson cleared up this subject. He says, that they arrive in Pennsylvania

from the 12th to the 20th of May when they go to the north; that from June till August, the male changes his colour, and assimilates the female, when they retire to the south; that the organs of birds, by which the sex is detected, are, in autumn, no larger than the smallest pin's head, and that the spring increases them a hundred fold, which led to the error of Catesby, when he applied the anatomical knife. (*Wilson's Ornithology*, vol. 2.) That in October they visit Jamaica and Cuba, and return to the continent early in the spring. This is a most satisfactory solution of all the doubts which have existed on this subject. When dr. Barton states, that the females exclusively make their appearance in Philadelphia, about the 20th of August, the male bird has then changed its colour, and both sexes are on their southern journey. When Catesby and Bartram say, that the females only appear in autumn in Carolina, it is only a continuation of the southern progress of both sexes identified in external appearance. When Catesby made his dissections, and concluded that all his subjects were females, it was in September, when the sexual distinctions are not palpable; but when they became so in the spring, he had no difficulty in recognising both male and female.

I might extend these remarks, on similar topics of inquiry, but I have already occupied too much ground; these slight sketches will indicate what an interesting and spacious field of investigation might be explored.

NOTE 19.

In 1810 I saw a great number of ravens on the borders of the beautiful lake Canadesaga, or Seneca, near the village of Geneva, and was told that no crows had made their appearance in that part of the country. Michaux, in his travels before quoted, observes, that the crows have not yet been seen in Tennessee; but it is probable that their appearance is only deferred, for they are already very destructive in Kentucky. The gray rats of Europe in like manner follow the establishments of the whites; they have not yet penetrated into Cumberland in Tennessee; they make their appearance a few years after the country has been inhabited.

NOTE 20.

The *lepus americanus* described by Linnæus evidently means our wild rabbit. It cannot apply to the northern hare, which is evidently larger than it.

Dr. Belknap denominates our hare the *lepus timidus*, or common hare, and our rabbit the *lepus cuniculus*, or common rabbit of Europe. He is mistaken in both appellations. The common hare does not exist in this country, nor, it is believed, in any part of America, although Linnæus says that it inhabits Europe, Asia, and America. We certainly have no animal corresponding with it. Nor does our hare resemble the *lepus variabilis*, as described by Linnæus. He says that it inhabits the northern hills of Europe, Asia, and America, migrates in troops in winter into the plains, and returns in spring to the mountains; that it is easily tamed, is playful, and fond of honey. This does not, in any respect, apply to our hare, nor does his description of its color and changes apply. Our hare is the most wild and indocile of animals. I had several of them caught alive at Albany, with a view of letting them loose for propagation in the thick, impenetrable swamps of Long Island; but such was their wildness that of twenty or thirty procured for that purpose, they either pined away, or killed themselves by beating against their cages, and I therefore could not succeed in my plan. They were entirely white, and their flesh is excellent.

Kalm describes our wild rabbit as a hare, and as much smaller than the Swedish hare, and but little bigger than that of the rabbit of Europe. (*Kalm's Travels*, vol. 1.) He further says, that the hare at Hudson's Bay, and in Canada, (the hare of which I speak,) perfectly corresponds with the Swedish hare, being in summer of a brownish gray color, and in winter of a snowy white. Mr. Pennant says, that the varying hare weighs only six pounds and a half, the common hare upwards of eight pounds, and the American hare, or our wild rabbit, from three pounds eight ounces to four pounds and a half; and he says that the first is met with in Canada and Newfoundland, after which the species ceases to the southward, or at least he has no authority for its being continued; the hare of New England seeming, by Josselyn's account, to be the American hare or wild rabbit, that inhabits Greenland, and is found about the rocks at Churchill, and the straits of Hudson's Bay, but that it is not common. We must, therefore, succumb to these great authorities, and acknowledge that our hare is, at least, a variety of the *lepus variabilis* of Europe. So far, however, from being confined to Canada, as is represented, it is in great numbers about Albany, and has been seen near forty miles to the south of that place, on the east side of the Hudson. Its food is said to be grass, white moss, and the bark of the birch-tree, of which it is very fond; it does not burrow in the ground, but harbors in hollow trees. Dr. Wil-

liama, in his History of Vermont, says, that a large hare weighs eight pounds, and the largest rabbit seven pounds. Hearne saw the varying hare as far north as latitude seventy two, and says it sometimes weighs fourteen or fifteen pounds.

As connected with this subject it may not be amiss to observe, that it is not probable that either our hare or rabbit can be domesticated. The common rabbit of Europe, however, would flourish here, and its skin alone would render it an object to have warrens made for its habitation. Its amazing fecundity is well known. It lives to the age of eight or nine years, and is capable of procreating at five or six months. The female is gravid thirty or thirty-one days, and she will bear seven times annually, and produce five young at each time. Supposing this to happen during the space of four years, and that three of the young at each producing are females, the increase will be 478,062. This exceeds the fecundity of the pigeon, which, according to Pliny, may produce, from one pair, 14,760 in four years. Until of late years the gray rabbit was the only species in the english warrens; at present the silver-haired rabbit is sought after, and has, within the few last years, supplanted the other, because the skin is dressed as a fur, and sells for more. (*Daniel's Rural Sports*, vol. 1.) It is believed that the tame rabbit which has been brought into this country in a domestic state, is not the proper rabbit for stocking warrens. It is not a little surprising that this easy source of profit has been entirely overlooked by us.

NOTE 21.

Homer, who has been closely imitated by all the celebrated epic poets, has thus described the migration of cranes:

So when inclement winters vex the plain
With piercing frost, or thick descending rain;
To warmer seas the cranes embodied fly,
With noise and order, through the midway sky:
To pigmy nations wounds and death they bring,
And all the war descends upon the wing.

POPE'S TRANSLATION.

Virgil thus describes the same subject:

————— Quales sub nubibus atris,
Strymoniz dant signa grues, atque æthera tranant
Cum sonitu, fugiuntque notos clamore secundo.

ÆNEID, Lib. 10.

On comparing these descriptions, of the four greatest epic poets who have adorned the world, can there be any hesitation in awarding the palm of superiority to Milton.

The *anus canadensis*, or wild goose, when formed into a phalanx for migration, appears in the shape of a wedge.

Although the ancients were so much puzzled about the migration of birds, that they supposed it extended to the moon, yet it is now no longer a mystery. The departure of the swallow has been a subject of more speculation and fable than that of any other bird. The estimable Bartram told Dr. Barton, that he has seen, in the autumn, large flocks of all our four species of swallows, on their return southward from Pennsylvania, through Carolina, Florida, &c. and in the spring on their return to the northward again. *Fragments of the Natural History, &c.*

Catesby supposes, that birds of passage, particularly swallows, pass to the same latitude in the southern hemisphere, as the northern latitude from whence they came; that they retire, for instance, from Carolina to Brazil, and particularly, that our chimney swallow corresponds with the description of Margravius' andorinha, which he considers a full confirmation of his hypothesis. The european swallows probably retire to Africa. Adanson, when within fifty leagues of Senegal, caught, from the shrouds of the vessel, four european swallows. This was on the 2d of October, 1749, and they were then retiring from the approach of winter to Senegal, in the torrid zone, where they are never seen but at this season of the year, along with wagtails, kites, quails, and other birds of passage, and they only spend the winter, without building nests, or producing young. Our chimney swallow is not known in Europe. And our *hirundo rustica* is not precisely like that of Europe; it disagrees particularly in the colour of the breast, which, in the latter, is white, like that of our bank swallow, whereas ours is ferruginous. Kalm says, that they nearly correspond in colour, but that there appears a small difference in the note; they are, probably, varieties of the same species. Dr. Barton thinks that our bank martin, or sand swallow, is not the *hirundo riparia* of Linnæus. Kalm, in his voyage to this country, saw, on the first of September, about one thousand miles from our coast, some land birds flying about the ship, which he took for sand martins, (*hirundo riparia*;) sometimes they settled on the ship, or on the sails; they were of a grayish brown colour on the back, their breast white, and the tail somewhat furcated. They were driven away by a heavy shower of rain. On the next day a swallow fluttered about the ship, and sometimes settled on the mast, and several times it approached the cabin windows, as if willing to take shelter there. Eight days afterward, within the american gulf, an owl and a little bird settled on the sails. On the 12th of September, a wood pecker of a speckled gray

colour on the back, extremely fatigued, and another land bird, of the passerine class, endeavored to rest on the ship. Kalm's destination was Philadelphia, (where he arrived on the 26th of September,) and from the 25th of August, to the beginning of September, the swallows retire from that part of the country. If those seen by Kalm were not driven by storms from their course, they evidently intended to take up their winter residence beyond sea. Catesby says that on his voyage from England to Carolina, (where he arrived on the 23d of May, 1722,) in the latitude of twenty-six degrees north, about midway between the two continents of Africa and America, which he says cannot be less than six hundred leagues, an owl appeared hovering over the ship, and after some attempts to rest flew off; this was on the 22d of March; on that day a hawk with a white head, breast, and belly, appeared in like manner, and the day after some swallows, but none ventured to alight on any part of the ship. This was about the time of year when swallows return from their winter migrations, and those were, probably, returning to Carolina. Kalm met them going to Africa in the fall, when they leave us, and Catesby met them returning in the spring, when they join us.

Our spring and summer birds of passage continue with us about six months, and are absent about that time. They avail themselves of high and favorable winds, to depart and return. A strong south or southwest wind, about the beginning of April, says Bartram, never fails of bringing millions of small birds of passage, who appear very suddenly in spring; and when the pewit or phoebe, (*muscipa fusca*), the first bird of passage which appears in Philadelphia, in the spring, which is generally about the first or middle of March, arrives, then pease, beans, and almost every kind of esculent garden seeds may be planted without danger of frost.

Bartram distinguishes birds as follows:

1. Those that arrive in Pennsylvania in the spring, from the south, and return in autumn, after building nests and rearing young.
2. Those that arrive there from the north, in autumn, where they continue during the winter, and return again in spring, and these birds continue their journey as far south as Florida.
3. Those that arrive in Carolina and Florida, in the spring, from the south, and breed, and return in autumn without going further north.
4. Natives of Carolina and Florida, where they breed and continue all the year.
5. The same of Pennsylvania.

NOTE 22.

The rev. dr. Miller, in his excellent work, entitled *A Retrospect of the Eighteenth Century*, states, that there are two thousand five hundred and thirty-six species of birds. Latham in the first six volumes of his *Synopsis of Birds*, has described ninety-six genera, and two thousand and forty six species. The additions made in his subsequent volumes have increased the number of species to three thousand.

The number of birds treated by Linnæus did not greatly exceed nine hundred.

There are in Great Britain three hundred and seven species of birds, comprehending all such as either visit that island at uncertain seasons, or are usually domesticated, as well as those which are known to be constant inhabitants, of which one hundred and fifty-four are land birds, and one hundred and fifty-three water birds.

I think it is not unreasonable to suppose that there are, in the United States and its territories, one thousand species of birds.

NOTE 23.

I believe it may be laid down as a general rule that all birds of the *anas* genus may be domesticated. That beautiful bird, the summer or wood duck, (*anas sponsa*), and the black duck, (*anas obscura*, or *nigra*), I have seen in a state of domestication. Mr. Cornelius Bergen, of King's county, about the latter end of April, put fifteen eggs of the black duck, on which the old one was sitting, under a dunghill hen; the next day twelve young were hatched, of which he raised eleven; one of them flew away in August, and returned in November, with a strange male, which was taken and tamed. It mixes readily with the common duck, and their offspring are productive. It lays a great many eggs, and has two broods in a year. Latham says, that the american wigeon, (*anas americana*), or pheasant duck, as it is called at New-York, has been domesticated; its flesh is most excellent.

Lewis and Clarke saw, on the Missouri, a small species of goose differing considerably from the canadian goose, and beautiful white brants, which, no doubt might be domesticated.

Scudder has, in his museum, two specimens of non-descript geese, shot on Long Island, and never seen before. One he calls the brant goose, and supposes it to

be a hybrid, produced by the Canada goose and the brant; the other is of a dark cinerous colour, and is rather smaller than the wild goose.

The *anas cygnoides orientalis*, or Muscovy gander, breeds with the common goose; and the *anas aegyptiaca*, about the size of the common goose, is a beautiful bird; they are common in gentlemen's ponds in England, and might be introduced into this country.

A variety of the *anas boschas*, or common duck, with a hooked bill, is kept in Germany, almost to the exclusion of the common sort. The french, or gray duck, is much larger than the common.

The swan is domesticated in Europe, and has been brought here. Neither this bird nor the wild goose will breed, unless measures are taken to accommodate them with appropriate places for that purpose. Islets ought to be made in their ponds, surrounded with high grass, in order that they may be allured to make their nests, and where they may sit without disturbance.

Dr. Barton says, that the Indians of Carolina had domesticated a large bird of the family of the grallæ, or waders, and no doubt several birds of this genus might be reclaimed from their wild state, and rendered useful.

The hoco goes by different names: it is called curasso in Brazil, and in Surinam it is called the powesa, and peacock pheasant; it is about the size of a common turkey; is a beautiful bird; the flesh is excellent; it is the *crax alexator* of Linnæus. Scudder has a beautiful specimen in his museum. It is sold at Parimaribo for more than a guinea a-piece, and it ought to be naturalised here.

The peruvian hen, or *crax rubra*, has been introduced into England. The flesh is white, and esteemed good. The climate of that country is supposed not to be warm enough for it, as the toes are apt to rot off. Beside these, there are in Guiana and Brazil, a new species of dunghill hens from the interior, the *yacou* of Cayenne, which is larger than a fowl, and breeds in a domestic state, the *dindon*, or *meleagris cristata* of Linnæus, which inhabits Brazil, where it is tamed, and the flesh is much liked; the *parraka* of Buffon, and *hannaquam* of Bancroft, the size of a small fowl, its flesh good, and it is in a domestic state; and also the *marail* of Buffon, and *marcotee* of Bancroft, about the dimensions of a fowl. I am not certain but that some of these are the same bird under a different name. If our climate is too cold for them, they may answer in the southern states.

It may also be considered a general rule that all birds of the *columba* genus may be domesticated. Our poultry may, in this respect, be greatly improved, not only in variety, but in size.

The great crowned indian pigeon (*columba coronata*) has been brought to Europe alive from the East Indies, where it is kept as domestic poultry. It is as large as a turkey.

In Java, Celebes, and Ceylon, there are eighteen or twenty species of wood pigeons, some of which are as large as a small hen.

We have no pheasant in this country. Governor Wentworth, of New-Hampshire, brought several pairs of pheasants from England, and let them fly in his woods at Wolfborough, but they have not since been seen. It is the phasianus colchicus of Linnæus, is the size of a fowl, and produces cross breeds with hens; this production is supposed to be the origin of the game cock. It appears from Hartlib's Legacy that in 1650 these birds were kept tame in great numbers, and he mentions a lady who raised two hundred one spring.

The China pheasant (*phasianus pictus*) is a hardy, beautiful bird, and might be easily naturalized: it breeds with common pheasants. Scudder has a bird of this kind, and the golden pheasant of the same country, in his museum. The golden pheasant, and a pheasant called the ring pheasant, a variety of the common one, have been found at large in England.

The Padua cock and hen weigh from eight to ten pound, and is a variety of the phasianus gallus, or dunghill cock.

The phasianus gallus exists in a wild state on some of the moors in the northern counties of Scotland; the eggs are nearly double the size of ordinary eggs.

A variety of the tame kind has two toes behind, instead of one; of a large breed one has weighed fourteen pounds. Another frizzled variety has the feathers curled up; the flesh is firm and delicate; it is a tender kind, brought originally from the East Indies. The turkish cocks and hens are said to differ from ours in the variety and beauty of their colours.

Clavigero says, that there are two kinds of pheasants in Mexico, of the size of a goose, with a crest on their heads, which they can raise and depress at pleasure, that they are distinguishable by their colour, and some particular qualities. The first is called the royal pheasant, or coxolitti, and has a tawny coloured plumage, and its flesh is more delicate than that of the other. The latter is named tipetotohl, and will sometimes pick from his master's hand, meet him with signs of joy, shut the door with his bill, and fight like a cock in poultry yards; his feathers are of a shining black, and his legs and feet ash-coloured.

The tetrao francolinus of Linnæus is as large as the common partridge, it inhabits the warmer parts of Europe; it may be kept in aviaries where it breeds freely.

The tetrao rufus greek, or great red partridge, is larger than the common one.

The red legged partridge, or tetrao rufus, has been let loose in its wild state in England; they are all over Europe, Asia, and Africa, and are so tame in the isle of Scio, according to Tournefort, that they may be driven to seek their food in the fields like so many sheep.

The tetrao perdrix, the common partridge of Europe, is not larger than our quail, (tetrao marilandus;) with a little encouragement they have been made as tame as common poultry; they will not breed in a state of confinement; but if the eggs are placed under a hen, she will hatch them and rear the young as her own chickens. Willoughby says, that a certain Sussex man had, by his industry, made a covey of partridges so tame, that he drove them before him in consequence of a wager, out of that county to London, though they were absolutely free, and had their wings grown.

The common quail (tetrao coturnix) is a migrating bird, spread all over the old world, is seen from the Cape of Good Hope to Iceland; comes north in spring and departs south in autumn. It is about the size of our robin, and is not in this country.

The gold-breasted trumpeter (psophia crepitans) inhabits various parts of South America, is near the size of a turkey; its flesh is as good as that of a pheasant; it is called agame by the french, and cani-cami in Surinam; it is most easily tamed and a great friend to man, whom it follows, caresses, and even seems to protect, with the attachment of a dog; it is reared for domestic uses, and fed among other poultry.

The jabiru, or crane of Surinam, is larger than a stork; its head and primary feathers of the wing and tail are black, it lives entirely on fish, and is domesticated in poultry yards.

I have thus enumerated between thirty and forty species of birds, most of which may be kept as domestic poultry, and all of them may be made ornamental or useful. Indeed, we have the authority of scripture to a much greater extent. St. James says, "every kind of beast, and of birds, and of serpents, and things in the sea, is tamed and hath been tamed of mankind."

It is hoped that these hints may have a tendency to attract the public attention to this useful branch of domestic economy.

NOTE 21.

The fish-market of New-York may be considered as the general deposite of every eatable, and every curious inhabitant, of the waters. Every thing that gratifies the appetite for food or for novelty, centres here.

Notwithstanding this, it is an extraordinary fact, that until dr. Mitchill commenced his investigations, there was not a good catalogue of our fishes; and it

is well known, that New-York is very seldom mentioned in the books of ichthyology.

That distinguished gentleman commenced his labors in November, 1818; and he began at the very elements. Every sort of fish was procured, examined, and described. The specimen and the description were next compared with those in the best books; he frequently dissected the individuals which he had described, in order to make himself acquainted with the internal marks and characters, and sometimes he satisfied himself experimentally on their qualities as food.

He also availed himself of various ichthyological assistance, and more especially of the General Zoology of Shaw, the General History of Fishes by Bloch, and the Museum Ichthyologicum of Gronovius.

The classification has been attended, in several respects, with difficulty. He has adopted the five orders of *apodal*, *jugular*, *thoracic*, *abdominal*, and *cartilaginous*; but in some cases there were doubts about the genus, and in some instances about the species. There is reason to suppose, that many of the species are non-descripts. The whole which the doctor has examined and described amount to more than one hundred and fifty species and varieties. And in addition to this, he has made great progress in describing the cetæ, or whales; the testacea, and crustacea, forming the shell fish; and the mollusca, constituting the soft, boneless, and gelatinous class of animals. Dr. Mitchill's account of the *codfishes* of New-York may be seen in the Amer. Med. and Philos. Register, vol. 4.

If the whole world contains one thousand species of fish, as is said, it is not unreasonable to suppose, that the United States and their dependencies contain between three and four hundred. Our western lakes furnish a great number; and as our waters are discharged into every ocean that surrounds America, there can be no hesitation in assenting to the reasonableness of this estimate. The work of the doctor is now ready for publication. It ought to be accompanied by engravings, taken from correct drawings; and as the expense of such an undertaking is enormous, the munificent patrons of science and genius, and our enlightened public bodies, ought to come forward and promote the publication of a work so interesting, undertaken and executed by one who has done as much for the honour of american science and literature as any man living.

As connected generally with this subject I am happy to have it in my power to furnish a literary curiosity. It is a poetical version, by Dr. Mitchill, of the third Piscatory Eclogue of Sannazarius, who is thus characterized by Dr. Blair: "Sannazarius, a famous latin poet, in the age of Leo X. attempted a bold innovation. He composed piscatory eclogues, changing the scene from woods to the sea, and from the life of shepherds to that of fishermen. But the innovation was so unhappy that he has gained no followers. For the life of fishermen is, obvi-

ously, much more hard and toilsome than that of shepherds, and presents to the fancy much less agreeable images. Flocks, and trees, and flowers, are objects of greater beauty, and more generally relished by men, than fishes and marine productions." This may be true to a certain extent; but it does not follow that a description of the simplicity, activity, and variety of piscatory life, has not its charms and attractions, as well as a delineation of the tranquillity and composure of the pastoral state. It is well known that those who devote themselves to the sports of the waters, and the active pursuits of the fisherman and seaman, cannot be induced to change their destination; and surely poetical representations, calculated to recall to the memory scenes of such delight, and to awaken the mind to their contemplation, are worthy of the best efforts of genius, and deserving of the highest encomiums of taste and just criticism. Sannasarius wrote five eclogues. The third now published is called *Mopsus*, and has a considerable resemblance to Virgil's *Palæmon*. It is a conversation in which four speakers take their part. Their names are *Celadon*, *Mopsus*, *Chromis*, and *Iolas*. The contending fishermen extol the charms of their mistresses, *Chloë* and *Nisa*, as the most lovely and excellent of their sex. At last *Mopsus* decides that both have acquitted themselves well, and rewards one with a speckled shell, and the other with a branch of coral.

The third Piscatory Eclogue of Sannasarius.

ARGUMENT.

The scene of this eclogue is in the island of *Inarime*, called also *Pithecius* and *Ænaria*, lying westward of *Misenum* and southwest from the city of *Naples*. *Prochytes* or *Prochyta* is a smaller island, situated between the former and the beforementioned head-land.

The speakers in the poem are inhabitants of these islands. At least *Chromis*, one of the contending lovers, seems to be a native of *Ænaria*; and *Iolas* his competitor, appears to reside upon *Prochytes*.

The *Lucrine* lake or pond was not far from *Bauli*. This was the place to which the fishing party was driven by the southern storm. *Bauli* stands west of *Naples*, upon the continent, near *Baia*, on the shore of the *Tyrrhene* bay, or *Sinus Tyrrhenus*.

Parthenope is a village a little beyond the river *Sebethos*, east of *Naples*.

Mopsus after his return to *Inarime*, informs *Celadon* what occurrences had befallen the party at *Bauli*.

MOPSUS.

CELADON, MOPSUS, CHROMIS, IOLAS.

CELADON.

Come tell me, Mopsus, (since, as Ægon says,
The storm at Bauli kept you fourteen days,)
How you and Chromis, and Iolas, fared,
While all his rage the furious south prepared.
Did you, while he insulted sea and waves,
Find any pastime in your dreary caves?

MOPSUS.

What could our muses, Celadon, perform,
Listless and torpid, midst the roaring storm?
While conchs untouched escaped our active hands,
And crabs eight footed safely kept the sands.
Our boat was lodged in safety high ashore,
Our nets extended hung from oar to oar;
Beneath our feet the hooks and baskets lay,
And rods, and seines, and weirs obstruct our way.

Then Chromis due Inarime survey'd;
From you our skiff came hither, grieved he said;
(Ah, hapless exile) while our sovereign's cause
His youthful bands beyond the ocean draws.
One war despatched, another soon begins,
And lands remote the king victorious wins.
He thunders where Liguria's rocks abound,
And where the peaked Stoechades are found.
Beyond the Rhodanus our legions shone,
(I think Amilcon said it was the Rhone,)
Beheld the strand where ocean swells his tide,
And banks from which blue britons were descried;
Who, when the water ebbs, (if fame speaks true,)
Catch fish in plenty left exposed to view.

Renew not now my woes, Iolas cried ;
 But put, oh Chromis, this discourse aside ;
 For Lycabas alarm sufficient gave,
 When late we paddled on the Lucrine wave.
 In farthest climes he saw the setting sun,
 Beyond the waves and clouds his journey run ;
 Just as from our Cajeta he descends,
 And far beyond the land his circuit ends ;
 No noise is heard as down his chariot bends.
 The people's different modes he understood ;
 Their oaken houses and their huts of wood ;
 Their cities, places, names, and tribes he knew ;
 The bellovacians, and morinoes too,
 And rough tarbellians ;—words pronounced with pain,—
 How rivers wandered through a breadth of plain ;
 How some new Loire he sailed with covered prow ;—
 But other cares demand attention now.
 Do thou, since love of Chloris warms thy veins,
 Ascend this rock and alternate my strains ;
 Mopsus will hear, and succouring our need,
 Pour forth the music of his slender reed.
 They said, and I agreed ; without command
 My sounding pipe I quickly took in hand ;
 And as by turns the swains their silence broke,
 I furnished music to the words they spoke ;
 Nor more delay, his voice blythe Chromis tried,
 And quick responding Iolas replied.

CHROMIS.

Ye nereids, holy maids of ocean ! bear
 Gifts from your floods to please my cruel fair ;
 Or, if she slight them, search the deeps around
 Till for my desperate love a cure be found.

IOLAS.

Ye sirens, powers revered ! attend my prayer ;
 Let Nisa own me, and her slights forbear ;
 Or see me die ;—beneath the rolling wave
 Midst rocks and sea-wrack I shall find a grave.

CHROMIS.

As wherries on the level surface glide,
 When breathing zephyrs gently curl the tide,
 And on their seats the rowers careless lie;—
 When Chloris loved me, just so calm was I.

IOLAS.

Behold the rocks when angry billows sweep
 And from the bottom raise the troubled deep;
 The rocks are moved, the earth with trembling groans;—
 Is this the picture of my Nisa's frowns?

CHROMIS.

Oh Proteus, shepherd of the sea, oh sire,
 Oh king, attend a love-sick swain's desire;
 Go thou to distant Pithecuse, and there
 To Hyale the proud, at once declare,
 To tend my sea-born-monsters is *thy* care.

IOLAS.

Yon rock, that stands not far from shore, shall prove
 A firm memorial of my steadfast love;
 Swim to it, Glaucus, and to Nisa say,
 Lest, from my hardened hands she turn away,
 That *thou* to land dost haul my scaly prey.

CHROMIS.

Cyprus to Venus, Crete to Jove, is dear;
 To Juno Samos, Vulcan Lemnos, near;
 But while Ænaria shall my mistress suit,
 Samos and Lemnos fall to disrepute.

IOLAS.

Mars Rhodope, Phoebe Ortygia, loves,
 Mercury Cyllene, Pallas Hymettus' groves;
 But while Prochytes is my darling's spot,
 Hymettus and Ortygia sink to nought.

CHROMIS.

Here eaves, and rocks, and withs for nets abound,
 And rush and myrtle cluster thick around ;
 Was Phyllis present, or was Chloris by,
 How well could I the raging winds defy !

IOLAS.

Without my Nisa nothing seems to please,
 The lands are sad, and comfortless the seas ;
 I hate my hooks and nets ; with her before
 To fish were charming, even on Lybia's shore.

CHROMIS.

Sinuessæ mackrel, soles *Dinarchus* deals,
Herculia mullets, and *Amalphi* eels ;
 With blooming girls *Parthenope* is gay ;—
 Who now shall bid me seek elsewhere for prey ?

IOLAS.

Gudgeon in rivers, dragonet in weeds,
 Squid midst the reefs, in open water feeds
 The haddock ; I my Nisa's threshold court ;
 What happier island has so good a port ?

MORSUS.

Thus I remember how the rocks among
 With various strife they safe and shelter'd sung ;
 And praise and presents earn'd, befitting those
 To whom his commendation *Triton* shows :
 One gets the shell I div'd from *Circe's* ground,
 With specks and purple beautified around ;
 The other gains a coral in its pride,
 With knobs and branches well diversified.

(Additional article procured from Dr. Mitchell by the editor.)

The fifth piscatory eclogue of James Sannazarius, entitled *HERPYLIS PHARMACEUTRIA*. It is dedicated to Cassandra Marchese. The speakers are two.

DORYLAS and THELGON. (*Scene the city of Naples.*)

It is by no means unlikely, that Sannazarius derived his idea of introducing fishermen into poetical compositions, from Theocritus, who wrote at Syracuse in Sicily. That writer's first Idyl in Greek, is entitled *Thyrsis*. One of the speakers in the dialogue is a goatherd, who encourages Thyrsis to sing, by the offer of a cup, on which many fine things were carved, and among others, *an aged fisherman among rude rocks, drawing his net with great labour. You would say that he fished with all the strength he possessed. For his veins swell in his neck; and he appears as robust as a youth. And not far from this old waterman, is seen a vine beautifully loaded with ruddy grapes.* And in the third Idyl, a despairing lover declares that *he will leap into the waves, where Olypis the fisherman is on the watch for tunnies, (a sort of large mackerel.)*

This eclogue may be considered as having three distinct parts, first, the dedicatory verses; secondly, Dorylas's recital of the magical rites and words of ex-ecration practised by the enchantress Herpylis, against the ungrateful and per-fidious Mæon, who by deserting the lass that loved him, had driven her to dis-traction; and thirdly, Thelgon's narrative of his passion for the beautiful Ga-latea, whose coldness and aversion he endeavours to overcome by a confession of his ardent sincerity, and an enumeration of his valuable qualities and posses-sions. The whole is modelled upon the eighth eclogue of Virgil; with an in-version of the order of the topics; the elegy in Virgil's eclogue being first, and the imprecation last. Virgil had copied his first part from the third idyl of Theocritus; and his second part from the second idyl of the same.

But, let us now the well-known loves relate;
Which, as young Dorylas and Thelgon sat
Beneath the hanging rock's refreshing shade,
And sung; along the shores a murmur made:
To glassy Platamon where mermaids lave
And Serapis' sacred fount and cave.

If aught of honour to the sea belong,
Attend, Cassandra, and approve my song:

Whether palladian looms before thee spread
 Mæonian gold and nice arachne's thread ;
 Or dancing dryads, and Diana's maids
 Thou join, thyself a Dian ; and the glades
 Of fair Prochytes and thy native place
 Behold thee quiver-arm'd pursue the chase ;
 Or from thy palace of Dicharcus view
 The playful gambols of the nereid-crew.
 Nor will thy generous soul the attempt refuse
 Of an unbidden and a grateful muse.
 For future ages shall rejoice to see
 Sannazar's verses pay respect to thee.
 If but Apollo and his tuneful nine
 Shall waft me smoothly o'er the level brine,
 Our names and friendship shall survive decay ;—
 But Dorylas recites, and we must hear his lay.

DORYLAS.

Herpylia, of the Euboic sisters one,
 Had to Sebethos' watery surface gone ;
 Herpylis, who as Alcon's pupil shone
 Alcon to Phœbus and the muses known.
 Her sister too concurring in the thought
 Of efforts joint, her working-basket brought.
 With locks dishevell'd and her left foot bare
 She mutters long, and thus accosts the air :

Construct an altar, roscid lymph obtain,
 And hoary wormwood cropp'd on yonder plain.
 Him, *Him*, my magic spells shall scorch and tear,
 Who drove a wretched damsel to despair.

Revolve thou wheel, my bands pursue your race,
 And whirl o spindle with a hurried pace.

My brazen rhomb hæmonian arts shall try,
 Dispel the rains and clear the clouded sky ;
 Such power it hath, and such its wondrous sway,
 It draws the quivering fishes forth to day.

Revolve thou wheel, my bands pursue your race,
 And whirl o spindle with a hurried pace.

This flag which from the swelling ocean came
Is dry'd, and then consumed by rapid flame ;
So may his punishment false Mæon meet
And burn to cinders with devouring heat.

Revolve thou wheel, my 'bands pursue your race
And whirl o spindle with a hurried pace.

Thrice, moss and clawless crabs in fire I placed ;
And said, by fire let Mæon's bowels waste.

Revolve thou wheel, my bands pursue your race
And whirl o spindle with a hurried pace.

With weeping dewy wet this sponge appears ;
Oh sea-grown sponge imbibe my copious tears ;
And as thy thirsty pores the drops inhale
Mayst thou ungrateful Mæon's breast assail.

Revolve thou wheel, my bands pursue your race
And whirl o spindle with a hurried pace.

The pumice fattens as the waves subside
That toss'd by winds, convey'd it far and wide ;
But how can I, oppress'd by poignant grief,
From empty words and moaning, hope relief ?
And all the wrongs by graceless Mæon done
Shall I content repay in words alone ?

Revolve thou wheel, my bands pursue your race
And whirl o spindle with a hurried pace.

Come forth with jagged sting, thou poisonous ray ;
And thou who stoppest the sailing vessel's way
Remora, come ; let one base Mæon wound,
And one arrest his footsteps o'er the ground.

Revolve thou wheel, my bands pursue your race
And whirl o spindle with a hurried pace.

A black torpedo's spume and liver choose,
And pound and mix the dose with potent juice ;
I shall to-morrow send the dread regale ;
He'll drink, and instant find his vigour fail.

Revolveth thou wheel, my hands pursue your race
And whirl o spindle with a hurried pace.

As skilful Ægle bids, to pieces tear
In eastern seas matured, the slow sea-hare,
And draw his subtle poison forth; then go
And with it daub the threshold of my foe.
The porch bentear'd shall penetrate his nerves,
And cause a torment that his crime deserves.
Desist o wheel, my hands relax your race
And turn thou spindle with a gentler pace,

For me, to fragments break a halcyon's nest,
The charm is good to lull the waves to rest;
Perhaps it may compose the tumult of my breast.
Stop now my wheel, my hands suspend your race
Add rest o spindle from thy weary pace.

TURKISH.

Beneath this rock, by Galatea's side
I sat and view'd the landscape spreading wide,
Caprea's isle, the rocks with Siren's names,
Herculean ruins and vesuvian flames.
Above the waves thy head, o Triton, rear,
And let thy sea-green countenance appear.

To Nereus, Triton may my sufferings tell,
And sound my groans upon his crooked shell;
When words of woe will wake wave-wandering whales,
And rocks shall hear them floating on the gales.
Above the waves, thy head, o Triton, rear,
And let thy sea-green countenance appear.

Here, when I first perceived a lover's flame,
At my request fair Galatea came;
She stretch'd her snowy hand, but not to strike;
And look'd me so; I never saw the like.
Above the waves thy head, o Triton, rear,
And let thy sea-green countenance appear.

Come hither quickly, darling care and see
 I've quitted fishers, boat and all, for thee.
 Above the waves thy head, o Triton, rear,
 And let thy sea-green countenance appear.

Here with intent to please my lovely maid,
 The aspiring poplar beautifies its shade :
 I oft embrace it ; and with passion blind
 Imprint a thousand kisses on its rind.
 I trace thy footsteps o'er the yielding sands,
 And dress with flowers whatever touch'd thy hands.
 Above the waves thy head, o Triton, rear,
 And let thy sea-green countenance appear.

Whom likest thou more than me ? if verdant trees
 And copses neat and browsing goats can please ;
 All these are mine ; I study song ; and mark
 My endless verses on the beechen bark.
 The beech-tree thrives amidst my sculptur'd wounds,
 And forests echo with Manalian sounds.
 Above the waves thy head, o Triton, rear,
 And let thy sea-green countenance appear.

Or, oh my love, if scenes along the shore,
 And wealth of ocean shall delight thee more ;
 Who better skill'd than I the fish to wound,
 With barbed tridents ? or with nets surround ?
 Above the waves thy head, o Triton, rear,
 And let thy sea-green countenance appear.

Could dextrous swimming in my favour plead,
 I'd beat the dolphin's and the tunny's speed :
 But wherefore boast I ? scarcely can I count
 My hooks' and nets' and lines' profuse amount.
 Liguria's rocks and Gallia's shores survey'd
 Confess me master of the angler's trade ;
 Varus and Arar like respect decree ;
 As do the monsters of the british sea.
 Beneath the waves thy head, o Triton hide,
 Thy sea-green face conceal below the tide.

And yet thou shunnest me; hard unyielding fair!
 And still I live and breathe my native air;
 Accept my presents, or no more thou'lt see
 Thy faithful Thelgon bend the supple knee.
 Go, giddy girl! thy coquetry may gain
 Adventures new with many a simple swain.
 Beneath the waves thy head, o Triton hide,
 Thy sea-green face conceal below the tide.

NOTE 23.

This is the general opinion at Albany, and is alluded to by dr. Mitchell, in a letter to the reverend dr. Miller, (*Collections of the New-York Historical Society*, vol. 1.) where he says, "it is reported that the course of the herrings was more especially on the west side of the river." This fish is not of the same species which abounds at particular seasons in the european seas, as dr. Mitchell has satisfactorily shown. The european herring not only differs in its appearance, but in its manners; it never, like ours, deposits its spawn in the waters of fresh rivers. Catesby seems to have given currency to this mistake, in saying, that all the sea and river fish that he observed in Carolina, differ from those in Europe of the same kind, except pikes, eels, and herrings. Kalm, who was well acquainted with this fish, on the other hand asserts, that what are called herrings in New-York, differ greatly from the european herrings. General Lincoln, in a very interesting letter to dr. Belknap, (*History of New Hampshire*, vol. 3.) has successfully shown, that the river fish never forsake the waters in which they are spawned, unless some unnatural obstructions are thrown in their way; that when obstructed, they do not seek new sources in which they may lodge their spawn, but that they are so strongly allured to the same route, that they annually return to their natural river, pressing constantly for a passage into their mother pond; that the quiet waters of the lake can alone give that nourishment and protection necessary to the existence of the egg, the preservation of which is indispensable if an extinction of the schull is to be prevented. I have no doubt, therefore, but that the mode in which our herrings ascended the river, is truly stated. The Sebastacook which falls into the Kennebec, is supported by numerous streams which abound with the small river fish, such as alewives, &c. and the inhabitants of that country say, that at the time of the running of these fish, they ascend the streams at distinct periods in succession, and that the schulls re-

ver separate, interfere, or transgress in their way to their respective ponds or lakes. The great spawning rendezvous of our herrings, were the cool wholesome waters of the Saratoga Lake. At the proper season the lake was filled with them, and they afforded abundant supplies to all the surrounding country; its outlet fish creek was obstructed by mill-dams, which prevented the ascent of the fish. The consequences have been not only to exclude it from the upper waters, but to create a most serious diminution in the waters below. If it had not been for this obstruction, we would have had not only a sufficiency for our home supply, but a valuable article for exportation. The state at large is interested in removing these barriers against the ascent of the fish. Let the mill-seats be purchased, the mill-dams demolished, and the communication be completely opened; and let herrings, at the time of spawning, be conveyed alive to the Saratoga Lake; their offspring will, in due time, descend to the ocean, and inevitably return. At the first settlement of the town of Hingham, in Massachusetts, the alewives were in such plenty as to give a full supply to the inhabitants, which was destroyed by the erection of the mill-dams, that prevented their ascent to a pond. The people attempted, after a great lapse of time, the re-establishment of them, in which they succeeded by opening proper fishways through the mill-dams, and conveying the fish in the spring of the year, in a proper vehicle, into the pond; this was done by keeping it near the bank of the river, and frequently shifting the water in the vessel. After this, the fish increased annually until there was a pretty good supply, but as there were many shoal places in the river which required very constant attention, the expense of which, and the loss sustained by stopping the mills, exceeded, in the opinion of the town, the advantages of the fish; the business was neglected, so that for a number of years they have been entirely cut off from the pond. Notwithstanding, some of the fish annually return to the mouth of the river, urging a passage up, but they are decreased in number and reduced in size.

Dr. Barton has very justly observed, that "There is a vast chasm in the History of the Fish; a chasm, too, in relation to which I have always deemed the most interesting part of animal natural history, I mean the instincts, or manners, or habits of animals. How little do we know of the instincts of the fishes! forgetting that the element in which they live precludes us from acquiring an easy or a rapid acquaintance with the *mores* of the fishes, and not sufficiently modest to acknowledge their own incurious supineness, the best naturalists have fallen into the error, that fishes are a stupid race of beings; that they discover very little of ingenuity; and that they are in a great measure strangers to that *storge*, or powerful affection, by which animals are so generally attached to their young. I venture to assert, that very much of what has been said on these subjects, is mere declamation, unsanctioned by enlarged observation or experience. My

own inquiries have convinced me that we have detruded the fishes to too low a station in the scale of animal intelligence and of storgal love. *Discourse on Desiderata in Natural History.*

Dogs have been trained for hunting and fowling. The falcon has been taught for a similar purpose; and the cormorant has been rendered useful in catching fishes. But I believe, it is not generally known, that the indians of the Antilles, had the art of taming a species of sea-fish, and employing them to chase other larger fish. Of this art, Oviedo Gomara, and other writers make mention.

The species of fish which those indians trained to chase large fish, as they train hawks in Europe to chase other birds, was rather small, called by them, guicanan, and by the spaniards, reverso. Oviedo explains the manner in which they made use of this fish to chase others. *Clavigero's Mexico*, vol. 2.

After this, we certainly can have no hesitation in believing, that the same fishes return periodically to the waters of their nativity for breeding, and pursue a prescribed, undeviating course.

NOTE 28.

Some are of opinion that in the upper lakes there are salt water fishes which have been left there since the retreat of the waters after the general deluge, and that they cannot return to the ocean on account of the cataract of Niagara. A captain of a vessel, who was well acquainted with the navigation of those lakes, assured me, that he could in the spring and fall, when the floods are high, go with his vessel, drawing six feet water, from Black Rock in Lake Erie, to Lake Michigan, from thence up the Chicaga creek, to its then junction with the Illinois river, thence down that river to the Mississippi, thence to the Gulf of Mexico, and that then, of course, he could come round to New-York. The sea-fish could easily proceed in this rout; if not, some of them might leap down the falls and effect their escape.

There is certainly, however, a very great resemblance between the fishes of Lake Erie and the fishes of the Atlantic.

1. The *white fish*; a most delicate fish, and superior to the shad in flavour. Its head and mouth are like those of our shad, and so is the fish generally.

2. *Herring* ; thicker through the body, and nearly the same length as that on the sea-coast. It resembles the Nova Scotia herring.

3. *Sheep's head* ; like ours, but no teeth ; a hard, dry fish.

4. *Basse* ; is a dutch word, signifying perch. *Black, or Oswego, basse*, a fine fish, like our black fish.

5. *Rock basse* ; like the sea basse.

6. *White basse* ; in shape like our white perch, but rather longer. The tail resembles that of the rock fish, and its sides are striped.

7. *Sturgeon* ; is the largest fish in the lake. It has no dorsal fin. In respect to shape, it is similar to that in the Hudson, and has the same habit of vaulting.

Sturgeon have been caught in Lake Ontario weighing one hundred pounds.

8. Sun fish.

9. *Musquenonges*, or pickerel ; a fine fish ; it has been caught forty-five pounds in weight.

10. Pike.

11. Very large snapping turtles.

12. Muscles.

13. *Cray fish* ; a species is found in all our small streams exactly like the european : but they have greatly diminished.

14. A species of clams.

15. *Sword, or gar, fish*.

This catalogue is very imperfect ; for there are, besides these, a number of other kinds.

Salmon have been caught, in the Seneca river, in every month of the year. They sometimes weigh thirty-seven pounds. They pass Oswego, and go up the Oswego river in April, are then in fine order, and spread over all the western waters in that direction, and return to Lake Ontario in September and October, much reduced in size and fatness. If this fish has the same habits as the european salmon, the numerous conical collections of gravel which are to be found near the margin of several of the western rivers, must have been erected by them. In England they deposite their spaw in holes made purposely in beds of gravel, and covered with successive layers of the same materials, and as it becomes animated each individual liberates and provides for itself. Their growth is singularly rapid, arriving at six or eight inches in length early in the spring, at which season the whole becomes immensely numerous, follow the old fish by descending with floods to the sea.

Although there is no animal, if we except man himself, that is so universally disseminated over every climate and country in the globe, as the common eel, being an inhabitant in almost every instance where fresh water flows or is per-

manently stationary, yet, strange as it may appear, I am told that none are to be seen above the cataract of Niagara, or in Lake Erie. The eels migrate every autumn to the sea, for the purpose of propagation, and the young ones return up the streams in spring and summer, in immense numbers. Some stay in fresh water all the year; but they do not breed; and it seems to be a fact well established, that they do never breed in fresh water, the periodical descent of the old ones to the ocean, and ascent of the young ones from thence, prove that the scene of their propagation is in the sea itself. The route by the Mississippi is so long that these periodical journeys are impracticable; and although often seen ascending the rocks forty or fifty feet at the Niagara falls, yet they have been invariably driven back, and have not been able to reach Lake Erie in that direction. The eel is, in one respect, like the shad; the latter does not attempt to ascend the Mississippi; now and then a meager herring is caught at Pittsburgh, which has struggled upwards of two thousand miles against a strong current. If eels were left in Lake Erie after the deluge, they must have become extinct in process of time, from the impracticability of access to the ocean, where alone they can propagate. A remarkable fact, corroborating this opinion, occurred, a few years ago, in the vicinity of this city. The river Passaic is formed by the union of three considerable streams, called Rockaway, Long Pond, and Ramapough creeks. Until a canal was, some years ago, cut round the great falls at Paterson, no eel was ever seen in the waters above. Since that time they abound in those streams, and are among the best in this country, both for size and quality. The elvers, or small eels, are seen every spring and the beginning of every summer, ascending those streams in immense numbers.

The natural history of the eel has always been, and still is, involved in great obscurity.

Oppian thus describes the generation of the eel:

"Not thus conchs, eels, and polypi embrace,
Nor purple lampreys rear their embryo race
In selfish coils, hermaphrodite they sit,
And their own power the vital spume emit.
Which gradual dropp'd on sands or slimy mud,
A silver offering render to the flood."

Translated by Goon, in a note to his *LUCANUS*, vol. 1.

It is not certain whether eels are oviparous, or viviparous. It is confidently asserted that many persons have convinced themselves of the latter, by opening the eel and taking from it a small, soft, whitish substance, knotted curiously to-

gether. Upon being put into the water this has separated, and the young eels were perfect, and, although not bigger than a small thread, have swam about; this discovery always took place the end of summer, or beginning of autumn, and has been adduced as evidence of their going down to the salt water to spawn. (*Daniel's Rural Sports*, vol. 3.) On the other hand, it is said, in the *Philosophical Magazine*, (vol. 34.) that they have indeed been generally supposed viviparous; "but the immense abundance of the young certainly bespeaks an oviparous progeny, and this is supported by analogy in the lamprey eel, which breeds commonly enough in most of our estuaries."

NOTE 27.

Hudson, the day on which he arrived at Sandy Hook, (*September 3d, 1609*) saw, as he denominates them, "Many salmon, mulletts, and rays, very great:" and when he passed through the Highlands on the 14th, he says there were "great store of salmon in the river."

It is not impossible but that this might have been the case. The Mohawk river formerly contained trout, a species of the genus *salmo*, but it now has none. Fishes sometimes leave their former haunts and repair to other places where they can find food more agreeable or abundant, and where they deposit their spawn with greater safety. It is now well known, that no salmon are ever seen in the Hudson, except a few strays who have missed their way into the Connecticut river. Salmon delight in clear, cool, and limpid water, and the Hudson is, particularly at the period of their vernal migration, discoloured and muddy. Since the wood creek which falls into the western lakes has been connected with the Mohawk river, by a canal, the latter has been supplied with a species of dace which has greatly increased; and black bass and a salmon have been taken who penetrated through the canal to the river: it would be a curious circumstance if the Hudson should receive the salmon through this new channel, and a singular voyage for this fish to enter, from the ocean, the Gulf of St. Lawrence, to swim up the river of that name to Lake Ontario, pass up the Onondaga river by Oswego, to the Oneida lake, ascend Wood Creek to the waters of the Mohawk river, and enter them by the canal, vault down the great falls of the Cohoes, descend the Hudson, and return at the next vernal migration to the St. Lawrence. Independently of the nature of the waters, and the food they furnish, there must be some latent cause for the preference which is given by fishes to certain rivers; perhaps this may be, in some measure, ascribed to their periodical return to the

place of their origin. How shall we account for the salmon being in Connecticut river, and in Merrimack and the rivers lying between, being perfectly destitute of these fish? Dr. Franklin told Kalm, that in that part of New England where his father lived, two rivers fell into the sea, in one of which they caught great numbers of herrings, and in the other, not one; yet the places where the rivers discharged themselves into the sea, were not far asunder. They had observed, that when the herrings came in spring to deposite their spawn, they always swam up the river, where they used to catch them, but never came into the other. The doctor's father, who was settled between the two rivers, took some in his nets as they were coming up for spawning, took out the spawn, and carefully carried it across the land into the other river. It was hatched, and the consequence was, that every year afterwards they caught more herrings in that river, and this is still the case. This leads one to believe that the fish always spawn in the same place where they were hatched, and from whence they first put out to sea.

I at one time entertained hopes that the Journal of Hudson would have furnished satisfactory evidence on this subject, from the mode of fishing. It appears, that one time on the coast of Nova Scotia, he caught twenty-seven great cods with hook and line, and if the fish he procured in the Hudson were obtained in the same way, it would prove that the salmon was not among them, as this fish is rarely got in any other way than by the spear or net. But it appears that he also used a net. In one place he states, that the men went in his boat on shore to fish, opposite against the ship, but could not find a good place; this shows that he employed the net. We can, therefore, place no reliance upon this consideration. The migrations of salmon with us, are vernal, and after depositing their spawn, they return to the ocean. It is presumed, that there are no salmon in our eastern rivers, in September; Hudson must, therefore, have meant some other fish. Linnæus in his *Systema Nature*, has enumerated fifty six different species of the salmon genus. Hudson certainly did not intend the common salmon. I believe, that the fish he meant, is our rock fish or streaked bass, which comes into the river about that time in great numbers.

Hudson says, "The river is full of fish;" "our boat went ashore and caught great store of very good fish." We know that this is not the case, except when the anadromous fishes ascend the river, and that even they have experienced a great diminution. Adrian Van der Donk, M. D. who had resided nine years in this state, when called New Netherland, and who published in the dutch language, in 1655, a topographical and Natural History of New Netherland, &c. says that, the Hudson, the Mohawk, and all the waters of the country, abound with every kind of fish in their respective seasons, and that in March, 1647, at the time of a great freshet, two whales of considerable bulk, went up the Hud-

son one hundred and sixty miles; one of them, however, returned and grounded about forty-eight miles from the sea shore, where four others, that same year, had also stranded and perished; the other grounded about one hundred and seventy-two miles up. Notwithstanding the inhabitants had obtained a great quantity of train oil from it, yet by reason of the swiftness of the current at that time, the whole river for two or three weeks acquired an oily taste, and exhibited an unctuous appearance, and the noxious effluvia were offensive eight miles off. Here it appears that in one spring, six large whales had ascended the Hudson; and they were, no doubt, allured in that direction by the multitude of fish. A whale has recently ascended the Delaware as far as the falls at Trenton. The Hudson is now not only a sterile river, but all its tributary streams partake of the same defect. Kalm says, that several gentlemen and merchants of New-York, between fifty and sixty years of age, told him in June, 1749, that during their lives they had plainly found several kinds of fish decrease in number every year, and that they could not get near so many fish now as they could formerly. Kalm further says, "At the first settlement, the bays, rivers, and brooks, had such quantities of fish, that at one draught in the morning, they caught as many as a horse was able to carry home. But at present things are greatly altered, and they often work in vain all the night long, with all their fishing tackle. The causes of this decrease of fish, are partly the same with those of the diminution of birds, being of late caught by a greater variety of contrivances, and in different manners than before. The numerous mills on the rivers, and brooks, likewise contributed to it in part, for it has been observed here that the fish go up the river in order to spawn in shallow water, but when they meet with works that prevent their proceeding, they turn back, and never come again." Independently of these causes, we know that fishes change their places of resort in the ocean, probably being frightened away by fishes of prey. "It has never been formerly known," according to the same writer, "that cod-fish were to be caught at Cape Henlopen; they were always caught at the mouth of the Delaware, but at present they are numerous in the former places.

Dr. Belknap says, that the basse was formerly taken in great plenty in the river Pascataqua, but that by the injudicious use of nets in the winter, this fishery was almost destroyed; that the salmon formerly frequented the same river, but that the numerous dams built across its branches, have obstructed the course of this valuable fish, and that it has for many years totally forsaken the river.

At a place called Columbia, on the Seneca river, twelve miles from Three River Point, a rolling dam was made over the river, and a canal of one hundred rods was cut, and two locks made in order to facilitate the navigation, which was greatly impeded, and at sometimes rendered impracticable by two shallow rapids called *M. Harry's and Jack's Rift*, the latter of which extends ten miles above

Columbia, and is very shallow and bad, particularly at the upper end. Since these operations, the inhabitants above complain most grievously about the diminution of salmon, which formerly abounded in the Cayuga and Seneca Lakes, and their tributary streams, and they attribute it to the dam. Now it is well known, that a rolling dam particularly, cannot oppose any serious impediment against the ascent of this fish. When the waters are high, several vessels avoid the canal and pass over the dam. It is indeed now understood, that the salient powers ascribed to the salmon, have been greatly overrated; and that it is a vulgar error to suppose, that the salmon coils himself up in the form of a ring, and raising his tail in his mouth, by the strained violence of an elastic spring overleaps the highest ascent in an aerial somerset. On the contrary, in every instance where he ascends those elevations called salmon leaps, he does it by swimming up and over the face and brow of the water-fall, penetrating through the interior of the descending body of water, by means of his vast muscular power operating on the action of his tail; and he affects his passage when the stream is very much flooded, and a large unbroken mass of water is descending. Without such a solid column of water, his ascent would be physically impossible; at these times the water, as in all cases of flood, is highly discoloured, and so dartingly quick is the ascent of the fish, as rather to resemble the transient gleam of a passing shadow over the water, than a real substance penetrating through it. (*Philosophical Magazine*, vol. 34.) It is nevertheless obvious, that this dam could not prevent the ascent of salmon: some other cause must be found out. The salmon is a very timid fish. In April, May, and June, 1810, the year after the canal was used, near two hundred boats had passed through it. The improved navigation had greatly increased the number of vessels which used it. The width of the river at the dam is about twenty-three rods. In salt water creeks, where no obstacles exist, the same complaint is made of the scarcity of fish. Newtown creek, which heads about four miles from the east river, by an uninterrupted navigation, is, when compared with its former abundance, now almost destitute of fish. The principal cause of the diminution is, in the augmentation of the number of boats, and the increase of the navigation, which have frightened the fish away.

Other reasons may be assigned of great weight. The cultivation of the country has had a prodigious effect in producing this diminution. Some species of fish subsist on the larva of insects and worms. The cutting down of trees, the drying up of swamps, marshes, the ploughing of land, and the exposure of the soil to the influence of the sun, have lessened these sources of subsistence. The streams and rivers have also been diminished in size, some of them have been entirely dried up. The fountains and springs which furnished cool retreats for the deposit of their spawn, are destroyed. The alluvial deposits have also

ched up their ancient places of resort, have discoloured the waters, and rendered them disagreeable and unhealthy ; and they have thus been expelled from their former domains, and have been obliged to look out for other haunts in wild and uncultivated countries.

Having so often referred to Hudson's celebrated voyage up the North, or Hudson, river, it may not be uninteresting to mention the several animal, vegetable, and mineral productions which, he says, that he saw on this voyage.

Salmon ; mulletts ; rays ; breams ; basses ; barbels ; indian corn ; dried currants ; venison ; pompions ; beans ; hemp ; chesnuts ; grapes ; tobacco ; yellow copper ; beavers' skins ; otters' skins ; oak-trees ; walnut-trees ; ewe-trees ; trees of sweet wood ; slate for building ; a stone like emery that would cut iron or steel.

And of indian manufactures, he saw,

Deer skins well dressed ; red copper tobacco pipes ; pots of earth to dress meats ; beads ; bows and arrows ; dresses composed of mantles of feathers ; dresses of skins of divers sorts of good furs ; ornaments of copper about the neck.

Van der Donk, before quoted, says, that the indians plant maize, and different kinds of beans, (which, they state, came to them from the southern indians) pompions, and squashes, and that their country abounds with mulberries of a superior quality, a great variety of plums, wild cherries, juniper berries, small apples of different kinds, hazle nuts, black currants, gooseberries, blue west-india figs, whortleberries, different kinds of blackberries, and one kind of as excellent a quality as in Holland, barberries, cranberries, artichokes, which grow under ground, aart-aackers, or espee d'Etruffer, (probably truffles,) easter beans, wild onions, and garlic. That in spring and autumn the water fowl are so numerous, that the inhabitants in the vicinity of the waters are often deprived of sleep by their noise ; that the swan is most numerous ; that there are three kinds of geese ; that the fishes are in the greatest plenty : streaked basse, shad, sturgeon, sea basse, black fish, herring, &c. and shell-fish of all kinds ; that the best oysters are sold from four to six stivers a hundred ; that the number of deer is incredible ; and that eighty thousand beavers are annually killed in those parts, exclusive of elands, (elks,) bears, otters, and deer, and yet their numbers do not appear to be diminished.

He further says, that when the indians are disposed to treat you in an extraordinary manner, they serve you with the tail of a beaver, the head of a streaked basse, roasted maize, or chesnuts beaten into flour, boiled with the fattest meat.

NOTE 28

The appearance of fish in waters which have no communication with other waters has perplexed naturalists. It is extraordinary that perch should have appeared in all the lakes of Ireland, and in the Shannon, at the same time, about forty years ago. If a heron, (says *Daniel's Rural Sports*, vol. 2.) has devoured the ova of a pike, and afterwards ejected them while feeding in a pond where there were none before, it is highly probable they may be produced from this origin, in the same way as the seeds of plants are known to be disseminated. Gmelin observes, that the duck kind swallow the eggs of fishes, that some of these eggs go down and come out of their bodies unhurt, and so are propagated. Adamson observed, in Africa, several small fishes in morasses formed by rain water, which, by their lively red colour, appeared to be roaches. The water dried up in a day or two and the fish died. The next year new ones appeared entirely like the preceding. The ponds here had no communication with the Niger, which is about three hundred fathoms off. How did these fishes get there? they were not brought by aquatic birds, because this species of fish is unknown to that river. Have they sprung from the ova of the preceding year; but how did they get there first? are they drawn from distant waters by the power of evaporation, and conveyed to those ponds? if the facts are truly stated, this is an unaccountable phenomenon.

An occurrence of a somewhat similar nature took place on this island some few years ago. Shortly after the first establishment of the Elgin Botanic Garden it became necessary to obtain a permanent and plentiful supply of water, for the various purposes of that institution, as well as to afford a place of growth for aquatic plants. To this end the proprietor, dr. Hosack, in a season of uncommon drought, had an artificial pond, of considerable extent, made on a portion of the ground that had hitherto been a mere morass. Upon excavating this morass, to the depth of from six to ten feet, a number of springs were opened, which afforded the necessary supply of soft fresh water. To the astonishment of all, at the ensuing summer, a considerable number of small fish appeared; and since that time this artificial pond, about a mile and a half distant from any waters, has abounded in fish of considerable size: some of them being five, six, and even seven inches in length.

In Lothrop's Philosophical Transactions, (vol. 2.) it is stated, that a pasture field in Kent, containing two acres, and far from fishponds, or the sea, but a scarcity of water, was all overspread with little fishes, conceived to be rained down, there having been, at that time, a great tempest of thunder and rain.

The fishes were about the length of a man's little finger ; were supposed to be young whittings, and were about a bushel in quantity.

Fishes may be propagated and brought from a distance in different ways. The gold fish of China has been imported alive in water from Europe to this country. Tench and carp have been introduced into England in a similar way. Our lakes and rivers may be stocked with proper fish, by bringing spawn in jars in imitation of the chinese, who often fetch the spawn of particular fishes from a great distance. Carps weigh from twenty to forty pounds, and live from one hundred and fifty to two hundred years; their fecundity is amazing; six hundred thousand eggs have been found in one carp. They may be carried ninety miles alive, packed in snow; and they are often fattened out of water, by being wrapped up in wet moss. Such a fish would be a great addition to our lakes. Success Pond, in the town of North Hempstead, was stocked, by dr. Mitchell, with perch, which he conveyed alive from a pond forty miles off.

About fifty years ago, a mr. Jacobi of Hanover, in Germany, after preparing a trough with gravel at the bottom, in a particular way, through which spring water was made to flow, took a female trout, and pressed and rubbed its belly gently, by which means it parted very easily with its spawn, without any prejudice to the fish, in a basin of clear water; he then took a male fish, and rubbed and pressed its belly gently, in the same manner, to let the melt, or soft roe, out, in the same basin where the female roe was in, and then stirred them together. The same result would follow if the roe was cut out of dead fishes and mixed together in the same way. He then spread the mixed spawn in the trough before the water was let in, and he then let in the water. A more particular account of this process is inserted in the 34th volume of the Philosophical Magazine. In this way he bred annually vast quantities of salmon, trout, and other fresh river fish.

It is calculated that one third of the inhabitants of Switzerland are maintained by fish from their fresh water lakes. When we consider the number of lakes, ponds, and fresh water streams, in our country, and the facility with which they may be supplied with the best kinds of fish, there can be no doubt but that, in course of time, this salubrious and copious source of subsistence will be considered an object worthy of attention.

NOTE 29.

It has been doubted whether red foxes, mice, rats, the common black fly, the hemlock fly, the honey bee, fleas, moths, bed bugs, and cock roaches, are indigenous to this country.

It appears that the unanimous testimony of the indians is, that the red fox did not make its appearance until after the europeans had settled the country, and this was after an extraordinary cold winter, when all the sea to the northward was frozen. Hence it has been inferred, that it came over from the north of Europe or Asia, on the ice. Another account is, that a gentleman of fortune, in New-England, imported a number for the sports of the field, at the first settlement of that country, and that from this stock, was propagated the race. It is well understood, that our red fox is the same as that of the old world. Kamshatka abounds with them; and when commodore Bering landed on the western coast of America, he saw several; and Lewis and Clarke also observed them on the west side of the rocky mountains. A very severe winter may have driven vast numbers from the regions of the north, into the lower country, about the time mentioned by the indians, as it frequently has other animals, and particularly squirrels, deer, and bears. Severe cold produces famine, and famine causes the migration of men, as well as of other animals. Little credit is to be reposed in the opinions of savages on such subjects.

Almost all the other animals have probably been imported, but this does not disprove their being also aborigines of America. Fleas have been found on gray squirrels and rabbits, killed in desert parts of the country, where no human creature ever lived; and in new settlements made on pine lands they abound. The cock roach, or *blatta orientalis*, is said to have been imported from the West-Indies; but, on the other hand, it has been found in the midst of woods and deserts. The common mouse and the rat, have also been seen, at an early period, in the crevices of stones and subterraneous grottoes in remote mountains, where no human being had ever been before. The black rat is, probably, a native of America, and the gray rat imported from Europe.

It is, perhaps, still more difficult to discriminate between native and naturalized plants in many instances. In some cases, there is no dispute; but, I believe, it is doubted, whether the peach, the water melon, and the parsnip, are indigenous.

NOTE 30.

This deduction is not a legitimate one. Honey might have been made by bees, specifically different from the common honey bee, and this appears to have been the case. Clavigero says, (*History of Mexico*, vol. 1.) "There are at least six different kinds of bees. The first is the same with the common bee of Europe, with which it agrees not only in size, shape, and colour, but also in its disposition and manners, and in the qualities of its honey and wax. The second species, which differs from the first only in having no sting, is the bee of Yucatan and Chiapa, which makes the fine clear honey of Estabentun, of an aromatic flavour, superior to that of all the other kinds of honey with which we are acquainted. The honey is taken from them six times a year, that is, once in every other month; but the best is that which is got in November, being made from a fragrant white flower, like jessamine, which blows in September, called in that country estabentun, from which the honey has derived its name. The third species resembles, in its form, the winged ants, but is smaller than the common bee, and is without a sting. This insect, which is peculiar to warm and temperate climates, forms nests, in size and shape, resembling sugar loaves, and even sometimes greatly exceeds those in size, which are suspended from rocks, or from trees, and particularly from the oak. The populousness of these hives are much greater than those of the common bee. The nymphs of this bee, which are eatable, are white, and round like a pearl; the honey is of a grayish colour, but of a fine flavour. The fourth species is a yellow bee, smaller than the common one, but like it furnished with a sting. Its honey is not equal to those already mentioned. The fifth is a small bee without a sting, which constructs hives of an orbicular form, in subterraneous cavities, and the honey is sour and somewhat bitter. The *filalpipielli*, which is the sixth species, is black and yellow, of the size of the common bee, but has no sting."

Although this account destroys the inference from Cortez's letter, that the common honey bee of Europe existed in Mexico at the time he wrote it, yet it furnishes a strong argument in another respect. It appears that it is now in Mexico, and that there are five other kinds of bees which produce honey; and some of them, honey superior in flavour, and greater in quantity. Now, if this be the case, what inducement could there have been to import the bee of Europe?

In Africa and in Guiana, a bee exists which is, perhaps, only a variety of our honey bee; the difference in the honey, and the size of the bee, may be owing to the difference of food and climate. Adanson, in his voyage up the river Niger,

was extremely incommoded by swarms of this insect, which visited the cabin of his vessel every day. "These bees," says he, "differ from those of Europe only in size. There is this singularity in their honey, that it never acquires a consistency like ours, but is always liquid, and like a brown syrup. We may affirm it is infinitely superior, both in delicacy and taste, to the best honey collected in the southern parts of France." *Adanson's Voyage to Senegal.*

Bancroft says, "the bees of Guiana are but little larger than the common house fly in England; their colour is black, and they are armed with stings; they deposite their honey in the cavities of hollow trees in the woods. This honey has a dark brown colour, a sweet but less agreeable taste than the european, and leaves a small bitter behind. It is found in large quantities, and is almost as fluid as olive oil; the colour of the wax is a dirty brownish black, and its substance somewhat softer than the yellow wax of Europe, having a sweet fragrant smell." *Essay on the Natural History of Guiana, &c.*

If the common bee did not exist in this country, without importation from Europe, then there was no creature in North America which produced honey, except in Mexico. It is not reasonable to suppose, that an animal, which is, in different species and varieties, so widely diffused over the rest of the world, should be denied to so extensive a portion of the globe, so well calculated for its sustenance.

It appears, that the opinion, that the honey bee was imported into this part of America from Europe, originated with Josselyn, who resided eight years in the Province of Maine, and wrote in 1672. Dr. Belknap says, that he "is the only writer who mentions them, and this was his opinion, with which tradition concurs." Kalm, who travelled through this part of the country in 1748, seems to have adopted Josselyn's idea. "The people were unanimous," says he, "that the common bees were not in North America before the arrival of the europeans, but that they were first brought over by the english who settled here. The indians likewise generally declare, that their fathers had never seen any bees either in the woods, or anywhere else, before the europeans had been several years settled here. This is further confirmed by the name which the Indians give them; for having no particular name for them in their language, they call them english flies, because the english first brought them over; but at present they fly plentifully about the woods of North America. However, it has been observed, that the bees always, when they swarm, spread to the southward, and never to the northward. It seems as if they do not find the latter countries so good for their constitution; therefore, they cannot stay in Canada, and all that have been carried over thither died in winter. It seemed to me as if the bees in America were somewhat smaller than ours in Sweden. They have not yet been found in the woods on the other side of the Blue Mountains, which confirms the opinion

of their being brought to America of late." *Kalm's Travels in North America*, vol. 1.

Upon this it may be remarked, that the country beyond the Alleghany Mountains was but very little known at that period; that admitting the truth of Kalm's assertion, that bees naturally migrate southward, they might then have existed in this country, without having extended their travels to the cold climate where Josselyn wrote, and, consequently, might have escaped his observation; that the indians might have been deceived by seeing bees flock to the vicinity of the white settlements, which they would naturally prefer upon account of the abundance of the food, and that, at all events, the opinions of the indians on subjects of this nature are not entitled to weight; and that when Kalm states that the bee of this country is smaller than that of Sweden, it goes to prove that it is a variety, and probably indigenous.

Bartram says, "In the course of conversation with dr. Grant of Mobile, I remarked that during my travels since leaving the Creek nation, and when there, I had not seen any honey bees. He replied that there were few or none west of the Isthmus of Florida, and but one hive in Mobile, which was lately brought there from Europe, the english supposing that there were none in the country, not finding any when they took possession of it after the spanish and french. I had been assured by the traders that there were none in West Florida, which, to me, seemed extraordinary, and almost incredible, since they are so numerous all along the eastern continent, from Nova Scotia to East Florida, even in the wild forests, as to be thought by the generality of the inhabitants, aborigines of this continent." *William Bartram's Travels through the Carolinas and Floridas*, in 1773.

In Lewis and Clarke's expedition up the Missouri, (vol 1.) it is stated, "We observed at the entrance of Maria's river, which is forty-seven degrees, twenty five minutes, and seventeen seconds north, that the bee martin, or king bird, is common to this country, although there are no bees here, and, in fact, we have not met with the honey bee since leaving the Osage river." The junction of the Osage and Missouri is in latitude thirty-eight degrees, thirty-one minutes, sixteen seconds; and it is not likely that the honey bee would, contrary to the law of its migration, extend itself into the inhospitable regions of the north, unless invited by the cultivation of the country. This, therefore, proves nothing. The opinion of Bartram is deserving of respect, and it certainly leans in favour of what he considers the general sentiment, that the honey bee is an indigenous animal, and I can bear testimony to the truth of his remark, that they are numerous in the wild forests. In the most distant and extensive woods of the west, remote from all habitation and cultivation, this useful insect is to be found. In a new settlement on the Ridge Road, in Genessee county, a lonely

solitary place, I saw a bee hive, composed of a piece of button wood, which was cut out of the woods full of bees. Dr. Williams, in his history of Vermont, (a work of great merit,) says, "From our earliest acquaintance with Lake Champlain, the honey bee was to be found in the open lands along those shores, at the distance of one hundred miles from the english or french settlements, and long before those settlements had begun to attend to the cultivation of this animal, and from the first settlement of New-England hunting for their nests has been a favourite and profitable amusement." Upon the whole, although the balance of authority is greatly against the bee as an indigenous animal of North-America, yet I am by no means satisfied that the weight of reason is not in the other scale.

Quære? Would it not be well to import the stingless bee of Mexico, that makes the aromatic honey of Estabentun, and also the bee of the Niger, whose produce is so superior, both in delicacy and taste to the best honey of the south of France?

NOTE 31.

I have made the number of serpents much too great. I do not believe there are twenty species in the whole United States.

Rattlesnakes are of two kinds: one considerably larger than the other. This serpent is never seen farther north than the mountains which surround Crown Point, in that direction. Henry saw one, two degrees farther north, to the northwest of French river, which discharges itself into Lake Huron. This circumstance was considered a very extraordinary one, and it greatly alarmed the superstitious fears of the indians. It is not true that the hog is invulnerable to the attacks of the rattlesnake. He fights it as he would any other animal, and, if wounded, invariably falls a victim. In Lowthorp's Abridgment of the Transactions of the Royal Society, (vol. 3.) a story is told of a rattlesnake, in Virginia, which had got into a place where there were pigs; two dogs were set upon the snake, and were mortally wounded; "the howling of the dogs gave notice to the sow, and made her come furiously bristling, and she run immediately into her den; but being likewise bit by the snake, she set up a terrible squeak, and run also into the river, and there died."

Dr. Barton says, (in opposition to the vulgar opinion,) that the crepitaculum does not give any certain indication of the reptile's age; for that, in general, very old rattlesnakes have very few bells, or rattles; and he asks, "Do the

young crotali, when alarmed or in danger, take shelter in the stomach (or oesophagus) of both their parents, or the mother only ?" Carver says, "I once killed a female that had seventy young ones in its belly; but those were perfectly formed, and I saw them just before retire to the mouth of their mother, as a place of security on my approach." Several intelligent persons say the same of the common viper, in England, and yet the London viper catchers assert that it never happens. In the Transactions of the American Philosophical Society, respectable testimony is adduced to establish similar occurrences. It is said that wild penny-royal, or dittany of Virginia, is fatal to this serpent, and that it never comes in places where it grows. See *Lenthorp's Philosophical Transactions*, vol. 2.

Van der Donk, in his account of the New Netherland, says, that there grows in New Netherland the snakeroot, which, as soon as the rattlesnake smells, he dies; that a large rattlesnake was found on Long Island, and some present took of that herb, and, after chewing it, fixed it on the end of a stick, and held it at some distance from the snake's nose, and that it no sooner inhaled the scent than it was seized with a fit of trembling, and died instantly; and that such was the rarity of the snake before his time, in 1655, that a man might go about into the fields and woods, and not see one in seven years; and that the Indians extracted its four sharp teeth, and used them as a substitute for lancets. Both these accounts of the deleterious effects of pennyroyal and snakeroot upon the rattlesnake, are fabulous.

Some of the most respectable ancient writers believed in the existence of a small kind of serpent, which moved forward and backward, and had two heads, one at each extremity. Galen and Ælian represented it as an undeniable fact; and Pliny says, "*Geminum habet caput, tanquam parum esset uno ore effundi venenum.*" Linnæus has described this species of serpents as having rings on the body and tail, no scales, and a smooth, equal cylindrical body; the tail hardly to be distinguished from the head, and very obtuse. Dr. Bancroft, in his Essay on the Natural History of Guiana, observes, that it is said there are three kinds of double-headed snakes in Guiana. He saw but one species; it was twelve inches long; had very fine teeth, almost obscured by the gums; its eyes were hardly discoverable; and both ends have the same external appearance, from whence it has been thought to have two heads, although only one mouth is discoverable, which is small. From this it appears that those who believe in the reality of two heads, one at each extremity, labour under a mistake; and that their error has originated from the similarity of the head and tail, and the smallness of the animal. Herrera, in his History of America says, that in Chiapa he found a two-headed serpent, eighteen inches long, in the form of a roman T, and very venomous: it not only kills, says he, by its bite, but if any tread upon

that part of the ground over which it has just gone, it proves fatal. Bancroft states, in a note to his work before referred to, that a similar kind of amphibia was found near a bay in Lake Champlain, in this state; but I shall give the account in his own words. "Since these sheets were sent to the press I have received a particular description of a monstrous amphibia, found near Lake Champlain, in North America, by an officer in the american service, who, with one of his majesty's draughts-men, was, during the late war, sent to make a survey of that lake. They were previously informed by the indians of the existence of these serpents, one of which they killed near a bay in Lake Champlain, which, in the maps of that country, has been since called Double-Headed Snake Bay. This serpent was a small one of the kind, it being about fifteen inches in length, and largest near the middle, terminating in a slender tail. The body at the other end, divided into two necks of equal size, to each of which was joined a perfect head, with two eyes, a large mouth and throat, a forked tongue, with teeth of the same species with those of the rattlesnake. The colour of the heads was a dark brown, and the scales on the back and side were variegated with alternate spots of dark and reddish brown colours, in magnitude and disposition resembling those of the rattlesnake. This serpent was a perfect monster, of whose existence I should strongly doubt, did I not think the veracity of the gentleman from whom I have this information, and by whom it was actually killed, unquestionable."

The frontispiece of Bancroft's book contains a print of this serpent, and under it is inscribed,

"This snake was found near Lake Champlain, in the year 1761, by Lieutenant Moses Park."

This account is thus confirmed by the concurrent testimony of Carver :

"The two-headed snake. The only snake of this kind that was ever seen in America was found about the year 1762, near Lake Champlain, by Mr. Park, a gentleman of New-England, and made a present to Lord Amherst. It was about a foot long, and in shape like the common snake, but it was furnished with two heads exactly similar, which united at the neck."

As this account relates to the Natural History of this state, and the author is respectable, I have thought it sufficiently interesting to insert it with this interrogatory: Is there a bay on Lake Champlain which bears the name of *Double-Headed Snake Bay*?

Since writing the above I have seen a specimen of the false amphibia in Scudder's museum. It was presented to the proprietor of that establishment by Dr. Mitchill, to whom it was given by Dr. Ross, who procured it in Jamaica. It is about eight inches long, and each extremity has the appearance of a head.

I have also seen in dr. Mitchell's possession a real *amphisbæna*, or coluber biceps, having two heads at one end of the body, diverging from the same vertebral column. It is between four and five inches long, and the colour is a light brown. It was presented to the doctor by John G. Bogert, esq. of this city, who procured it from captain Henry G. Hose, who brought this and two others of a similar kind from Toconroba, one of the Feejee islands, to this city.

Dr. Mitchell informs me that he has seen a coluber biceps in the possession of professor Walker, at Edinburgh; a second in Quebec, in the collection of general Davies; and a third was shown to him at Washington by president Jefferson; and from the frequency of their occurrence, the doctor is inclined to believe that this animal is not a *lusus naturæ*, but a regular production. If so, and his opinion is almost conclusive on such subjects, we must consider the real *amphisbæna*, or coluber biceps, as a new and distinct genus of serpents.

NOTE 32.

This is probably the *glycine apios*, or wild potato, which is nearly as good as the common, and which was, when boiled, a favorite food of the indians.

The Jerusalem artichoke, or *helianthus tuberosus*, grows spontaneously over the country, is sometimes brought to our markets for sale, and is a wholesome, agreeable vegetable. This plant ought to be cultivated. It produces about four hundred and eighty bushels an acre. It flourishes in almost any soil, bringing, almost invariably, a certain crop, and it is also proof against the severest frosts.

The bulb of arrowhead, or *sagittaria sagittifolia*, boiled, or roasted in hot ashes, was eat by our indians. It tasted nearly like potatoes. It is commonly an inch and a half long, and one inch and a half broad in the middle, is sometimes as large as a man's fist, and grows in low, muddy, and very wet ground. It composes a considerable part of the food of the chinese, and is cultivated by them. It ought to be carefully guarded against swine, who eagerly devour it. In a valley to the west of the Rocky Mountains, which extends seventy miles, it is found in great abundance, and is a principal article of trade between the inhabitants of that valley and those of the sea coast.

Our indians also made use of the root of a vegetable which they called *tawhokawkin*, or *tuckah*, and which, Kalm says, is the *arum virginicum*, or wake robin. When fresh it has a pungent taste, but when roasted it is like potatoes. It flourishes in moist grounds and swamps, and often grows to the thickness of a man's thigh, but is nearly extirpated by the hogs.

They also eat the dried seeds of the *orontium aquaticum*, called by them taw-lee; they were boiled in water, and eat like peas, or made into bread. This plant was plentiful in moist and low grounds. Whortleberries, or huckleberries, were dried by them and made into a dainty dish, by being mixed with fresh maize flour, and baked. They also gathered and dried hickory and black walnuts; took out the kernels and pounded them as fine as flour; mixed this substance with water, which took a milky colour, and was as sweet as milk.

The tuckahoe (or tawkee, as Kalm supposes) was probably a native of this state. The *lycoperdon* tuber of Linnæus, called truffles, grows here and in New Jersey, and we have a place called Tuckahoe. These tuberous productions are not the same. The indians made delicious bread from their farinaceous matter.

According to Lewis and Clarke, the indians of Columbia river eat the roots of a species of thistle, fern, rush, liquorice, and a small cylindric root, resembling in flavour and consistency the sweet potato.

NOTE 33.

This production has been used by the indians from time immemorial. In a curious book, entitled *A Description of the English Province of Carolina*, by the Spaniards called Florida, and by the French *La Louisiane*, etc. by Daniel Cœxe, esq. printed, London, 1741; it is thus described: "besides, this country naturally affords another sort of excellent corn, which is the most like oats of any european grain, but longer and larger; and I have been assured by many very credible persons, who, out of curiosity, had divers ways prepared it, that it far exceeds our best oatmeal. This is not sown and cultivated by the indians, but grows spontaneously in marshy places, in and by the sides of rivers, like reeds or rushes. The indians, when it is ripe, take handfulls, shake them into their canoes; what escapes them falling into the water, without any further trouble produces the next year's crop." Hearne saw it as far north as Churchill river, near the 60th degree of north latitude. Ellis, in his account of *A Voyage to Discover a North West passage*, mentions, that there are great quantities of wild rice by the sides of the lakes and rivers which run into Hudson's Bay, between the 50th and 55th degrees of north latitude. On the 21st September, Pike stopped at a Sioux village, between Pepin and the falls of St. Anthony, and in about 44 degrees 30 minutes north latitude, and found it evacuated, all the indians having gone out to gather fols avoin; and he says, that the indian traders chiefly depend for their support upon wild oats, of which

they purchase great quantities from the savages; and that at an establishment on Red Cedar Lake, near the Mississippi in the 47th degree of latitude, they give one dollar and fifty cents per bushel for it. The Menomeni, a nation of indians inhabiting on the northwest of Lake Michigan, are called, by the french, Fols Avoins, from this plant, which grows in great plenty among them. Henry, in his Travels in Canada and the Indian Territories, bought wild rice at Lake Sagunai in great abundance; he says it grows in shoal water, and the indians gather it by shaking the ears into canoes. Hennepin says, that among the fols avoins it appears above the water in June, and is gathered in September, and that it produces more meal than european oats. Mackenzie asserts, that the indians, on Lake Sagenuja, depend principally for food upon fish, and wild rice which grows spontaneously in these parts; that there is abundance of it on the banks of a small river which runs into the Lake of the Woods, about the latitude of 49 degrees; that from Lake Superior to Lake Winnipic, in latitude 50 degrees 37 minutes, "are vast quantities of rice, which the natives collect in August for their winter stores. To the north of 50 degrees it is hardly known, or at least does not come to maturity;" that the country between Lake Superior and the Mississippi was formerly very populous, and produced wild rice in great plenty. *Mackenzie's Voyages, Preface.*

Carver, in his travels through North America, states, that the fox river is rendered remarkable by the abundance of wild rice that grows on its shores, and that this grain, which grows in the greatest plenty throughout the interior parts of North America, is the most valuable of all the spontaneous productions of that country. Exclusive of its utility, as a supply of food, for those of the human species who inhabit this part of the continent, and obtained without any other trouble than that of gathering it in, the sweetness and nutritious quality of it attract an infinite number of wild fowls of every kind, which flock from distant climes to enjoy this rare repast, and by it become inexpressibly fat and delicious. In future periods it will be of great service to the infant colonies, as it will afford them a present support, until, in the course of cultivation, other supplies may be produced; whereas, in those realms which are not furnished with this bounteous gift of nature, even if the climate is temperate and the soil good, the first settlers are often exposed to great hardships from the want of an immediate resource for necessary food. This useful grain grows in the water, where it is about two feet deep, and where it finds a rich muddy soil. The stalks of it, and the branches or ears, that bear the seed, resemble oats, both in the appearance and manner of growing. The stalks are full of joints, and rise more than eight feet above the water. The natives gather the grain in the following manner: nearly about the time that it begins to turn from its milky state, and to ripen, they run their canoes into the midst of it, and tying branches of it together just below the ears,

NOTE 34.

In strictness there are but two species of wheat; with beards, and without beards. Winter, summer, gray, duckbill, gray pollard or fuller wheat, cone wheat, polonian wheat, siberian spring wheat, Switzerland spring wheat, ægyptian, bearded wheat, nurwaary wheat, brought from Barbary, german spelter, serland wheat, and froment tremais, so called because it is only three months in the earth, all varieties of one or the other of these species, have been in a greater or less degree cultivated in England, and each has some peculiar recommendation. I have seen lands in this state which have produced fifty bushels an acre of this most excellent of the cerealia.

In the Transactions of the Linnæan Society, it is stated, that the blight of wheat, (*uredo frumenti*), in the west of England, which was attributed to an insect, was owing to a fungus which had been long sown in the stem of the wheat. Sir Joseph Banks, in an excellent essay on the blight in corn, annexed to Curtis' Practical Observations on the British Grasses, has embraced the same opinion, and says, that the blight is occasioned by the growth of a minute parasitic fungus, or mushroom, on the leaves, stems, and glumes of the living plant; and he further states, that it has long been admitted by farmers, though scarcely credited by botanists, that wheat, in the neighbourhood of a barberry bush, seldom escapes the blight; that the village of Rollesby, in Norfolk, where barberries abound, and wheat seldom succeeds, is called by the opprobrious appellation of mildew Rollesby; that some observing men have, of late, attributed this very perplexing effect to the farina of the flowers of the barberry, which is, in truth, yellow, and resembles, in some degree, the appearance of the rust, or what is presumed to be the blight, in its early state, and that it is notorious to all botanical observers, that the leaves of the barberry are very subject to the attack of a yellow parasitic fungus, larger, but otherwise much resembling, the rust in corn. In opposition to the idea, that it is improbable that these fungi are the same, it is remarked that the mistletoe, the best known parasitic plant, delights most to grow on the apple and hawthorn, in England, but that it flourishes occasionally on trees widely differing in their nature from both of these; and in the middle states of America it is most frequently found on the *nyssa sylvatica*, or sour gum, but to the southward upon oaks.

An insect, called the *tipula tritici*, or wheat insect, has destroyed, in some places in England, about one twentieth part of the produce. An insect, called the *ichneumon tipule*, deposits its egg in the larva, or caterpillar, of the wheat fly, and this destroys it. Dr. Darwin gravely proposes, in his *Phytologia*, to counteract the pernicious effects of insects which produce blight, by propagating

the larva of the aphidivorous fly. It is not yet settled whether the hessian fly is of foreign or domestic origin: although a species of tipula, yet it is not the one just mentioned, as I am informed. The farmers on Long Island complain of the septennial ravages of an insect which destroys their barley, and which they denominate the army worm, from its numbers.

Dr. Barton has very justly remarked, that it is an object of the first importance to investigate the natural history of those insects, which are peculiarly injurious to us in any way, and that unfortunately our country, as much perhaps as any on this globe, abounds with such insects.

Dr. Smith, the celebrated president of the Linnæan Society, observes, that botany necessarily leads to the study of insects; for it is impossible to investigate plants, in their native situations, without having our attention perpetually awakened by the infinite variety of those active little beings, employed in a thousand different ways, in supplying themselves with food and lodging, in repulsing the attacks of their enemies, or in exercising a more than asiatic despotism over myriads below them; and he exaltingly exclaims that, in England, no branch of natural history, after botany, has, for some years, had more attention paid to it than entomology: while with us, to adopt the language of Dr. Bartoa, "notwithstanding the importance of the science of entomology, the history of our insects has hitherto excited but little attention."

NOTE 35.

Mr. Green, in his discourse on the botany of the United States, pronounces, that the sorin grass is a native of this country; that it has been discovered in Sussex county, New-Jersey, on the margin of the Genesee river, and on an island below the city of Albany. Whether this be the same as the sorin grass of Europe is still a question *sub judice*. In 1749 Kalm visited the island below Albany, and in his journal he has mentioned several of its vegetable productions: the *agrostis stolonifera*, if growing there at that time, escaped his penetrating eye; but, whether indigenous or not, we know that it has been imported and successfully cultivated; that its alimentary qualities, and its crops, are great beyond example, and that it flourishes in defiance of soil, drought, and climate.

I do not know that *sainfoin*, or *sainfoin*, (*hedysarum onobrychis*), which signifies wholesome hay, has succeeded as well in this country as in France, from whence it is derived. The milk of cows fed on it is nearly double, and makes most excellent cream and butter. It fattens sheep better than any other food,

and horses require no oats, although hard worked, when they are fed with it. Its increase of produce exceeds that of common grass land about thirty times, and it will last from ten to fifteen years. It yields an aftermath, or second crop.

Curtis, in his *Practical Observations on British Grasses*, speaks slightly of the *festuca ovina*, and says that it appears to him applicable only to the purpose of making a fine-leaved grass-plot, that shall require little or no mowing. On the other hand, Withering, in his botanical arrangement of all the vegetables naturally growing in Great Britain, intimates that the superiority of the spanish and english wool is owing to the abundance of this grass in the hilly pastures where the sheep are kept.

Curtis has enumerated twenty-five genera, and one hundred and twenty-three species of grasses growing in Great Britain, and has judiciously remarked, that to constitute the herbage of a good meadow there must be a combination of produce, batableness, and early growth. *Batable* is altogether an agricultural or provincial term, and he uses it to express cattle's thriving on the food they eat.

The best grasses of Europe have been neglected, and our indigenous ones have been, in a great measure, overlooked by us. Let our scientific men, our practical men, turn their attention to this and other important branches of husbandry, as yet scarcely noticed, and affording inexhaustible topics for investigation, and let them be encouraged in their labours by the observation of Bacon, that "Virgil got as much glory of eloquence, wit, and learning, in the expressing of the observations of husbandry, as of the heroical acts of *Aeneas*."

NOTE 36.

This grass produces a fine perfume, and has the same effect on tobacco as the vanilla bean. It delights in a rich soil, and may be easily cultivated. It is greatly superior, in its odoriferous qualities, to the *anthoxantum odoratum*, or sweet-scented vernal grass, the only one of that kind which grows in England. Cattle are very fond of it, and it must produce the most delicious milk, butter, and butchers' meat. There is, however, great danger of its total extirpation, as it is very scarce. Indeed, the same danger is to be apprehended, and the same fatality has, no doubt, occurred in other instances. Hudson, on the 6th of September, sent a boat to sound the Kills between Bergen and Staten Island, and his men on their return reported, that the "lands were as pleasant with grass and flowers, and goodly trees, as ever they had seen, and very sweet smells came from them." This is not now the case. The grazing of cattle, the rooting of swine,

the plough, and other implements of agriculture, have entirely destroyed a great number of the annual grasses and plants which formerly flourished in this country. Several persons told Kalni, so far back as 1748, that the loss of many odoriferous plants, with which the woods were filled at the arrival of the Europeans, but which the cattle have now extirpated, might be looked upon as a cause of the greater progress of the fever; for that the great number of those strong plants occasioned a pleasant scent to rise, in the woods every morning, and evening. The vegetable kingdom of our western country is uncommonly rich, and luxuriantly abundant, because cultivation has been but partially extended to it. Hogs have produced great destruction among all tuberose and bulbous plants. Even the laurel tree of Carolina has become almost extinct in many parts of the country, owing to the depredations of domesticated animals.

Although some plants, like some animals, are no longer seen in our country, yet the field of botanical investigation is immeasurable and boundless. Our country embraces every variety of soil and climate, mountains, rivers, lakes, and salt waters, and is the favourite depository of the vegetable riches of the earth. In the United States, we are yet in the infancy of this science.

The first edition of Linnaeus's *Species Plantarum* contains only 7,300 species. A curious amateur of botany took the pains to enumerate the plants described in Dr. Turton's translation of Gmelin's edition of the *Systema Naturæ*, and in a work of Willdenow, and found 2,046 genera, and 10,803 species of plants, of which 638 genera have but one species; 263 but two; 174 but three; and 124 but four. And it is supposed, that the whole number of described plants amounts to about 22,000.

Mr. Jacob Green has annexed to his well-written and interesting Address on the Botany of the United States, (delivered before the Society for the promotion of Useful Arts,) a Catalogue of plants, indigenous to the state of New-York. This list, which Mr. Green admits to be incomplete, contains about 403 genera, and 1,283 species.

The catalogue of the hitherto known native and naturalized plants of North America, made by that indefatigable and learned botanist Dr. Muhlenberg, contains but 863 genera, and not 2,800 species. It is not unreasonable to estimate the whole number of plants in the United States, and their territories, at 8,000 and as yet we have not described 3,000. What an opening does this afford for the operations of scientific inquiry? no wonder that Linnaeus was so anxious to visit this country. Catesby, in his *Hortus Europæ Americanus*, published in 1767, truly observes, that a small spot of land in America has, within less than half a century, furnished England with a greater variety of trees, than has been procured from all the other parts of the world, for more than a thousand years past.

From information which has recently reached me, I am persuaded, that our dutch ancestors paid more attention to the improvement and natural history of the country, than has been generally imagined. We are, as yet, greatly in the dark with respect to events and observations during their occupancy of New Netherland, as they termed their country; but the means of information are amply within our reach. De Leart wrote a book respecting it, wherein he gives a very particular account of the indians; and Megapolensis, an eminent dutch minister, who formerly lived in this city, also published a work on this country when a dutch province; and I have now before me a manuscript translation made by the rev. dr. Bassett, of dr. Van der Donk's History of New Netherland, published in 1655. It is very interesting, and it is to be hoped, that that worthy gentleman will meet with sufficient encouragement to publish it, and also correct translation of De Leart and Megapolensis, for which no man in this country is better qualified. Van der Donk states, that a certain surgeon, a resident of New Netherland, had formed an extensive botanical garden, in which he planted many medical roots, which he cultivated from the woods adjacent to his abode; but by the removal of that worthy gentleman from the country, his humane and patriotic exertions were lost to the world. This, I undertake to say, was the first botanical garden established in this part of America. It appears, also, from this work, that most of the medicinal and other herbs, with which the country abounds, were known to our dutch forefathers; that they took uncommon pains to introduce the best cereal gramina, legumens, and excellent vegetables, and fruit of various kinds, and have even cultivated canary seed; that they introduced the white and red, the cornelian and stock roses, wall flowers, tulips, imperial flowers, the white lily, and lily of the valley, ladies' rose, violet, and gold flower, and that the country abounded with flowers peculiar to it, of the most beautiful kind, to which the european was an entire stranger; viz. the sunflower, the red and yellow lily, the morning glory, the white, yellow, and red marygold, a species of wild eglantine, the different kinds of the bell flower, and many others.

Our dutch ancestors also turned their attention to improving the dyes of the country: great hopes were entertained from the wild indigo; and they not only supposed, that the common indigo might be raised to great advantage, but they actually tried the experiment. Seed was imported from Holland. The first attempt failed, owing, as it was supposed, to an extraordinary drought which prevented the plant from coming to maturity: but another experiment completely succeeded: the seed was sown near New Amsterdam, (New-York,) and a great crop was obtained; specimens were sent to the mother country, where good judges pronounced it of a superior quality. But what is still more extraordinary is, that there is reason to believe that it was contemplated to introduce

the famous orchilla weed. When the spaniards discovered the Canary Islands, they sought for it as eagerly as they did for gold: it was probable, that it was made use of to produce the gertulian purple of the ancients; and they also had in their view other vegetable dyes, which we cannot now accurately designate. "The *crap plant*," says Van der Donk, "for dying red, is not cultivated in New Netherland, but it is not to be questioned, that if it were tried it would yield well."

I must repeat my wish, that this curious work may soon see the light. It appears from it, that the country was so remarkably healthy at that time, that it was a strange thing to hear of a person being sick; that the east wind did not extend far west; and that the climate was as mild at that period as it now is.

NOTE 37.

See Busching's Geography, vol. 1. Temple's Works, vol. 3. Walpoliana. There can be no doubt but that several species of some of these trees existed in a wild state at home, previous to their introduction from foreign countries. It is presumable, for instance, that the chesnut always grew in Italy, and the cherry in France; but different kinds, on account of their superior excellence arising from cultivation, were imported by the ancient romans. Wherever their arms extended, they availed themselves of the choice fruits of the conquered countries, and the great generals who brought them to Rome took pride in giving them their own names, as in memory of some great service or pleasure they had done their country; so that not only laws and battles, but several sorts of apples or mala, and of pears, were called Manlian, and Claudian, Pompeian, and Tiberian, and by several other such noble names. Thus, in process of time, the inhabitants of Italy, who formerly lived on acorns, made the whole world tributary to their subsistence, as well as to their glory. Humboldt, in his Account of New Spain, (vol. 2.) says, that the *prunus avium* is indigenous in Germany and France, and has existed from the most remote antiquity in their forests, like the robur and the linden tree; while other species of cherry-trees, which are considered as varieties, become permanent, and of which the fruits are more savoury than the *prunus avium* have come to those countries through the romans from Asia Minor, and particularly from the kingdom of Pontus.

Turnips and carrots are considered indigenous roots of France; our cauliflowers came from Cyprus; our artichokes from Sicily; lettuce from Cos; and shallots, or eschallots, from Ascalon. The art of gardening was introduced into Eng-

land from the continent about 1500, prior to which most of the present produce of kitchen gardens was imported from the Netherlands.

NOTE 33.

The comparative mortality of London has not only greatly diminished within the last fifty or sixty years, but a number of diseases which, previous to that period, were very destructive, have almost entirely disappeared; for instance, the plague, the rickets, and the scurvy: while others that were formerly considered very mortal, are now viewed as no longer formidable; such as the small pox, the dysentery and intermittent fevers.

Other diseases, supposed to be less dependent on the physical than on the moral and political changes which Great Britain has undergone, have increased in number and fatality; and are attributed, chiefly, to the increase of manufactures; and, consequently, of the number of sedentary and otherwise unwholesome occupations: to the augmentation of the national wealth, and with it, of luxury and high feeding; and to the fluctuations in the conditions of life, attendant on the spirit of commercial speculation. To the first of these sources is ascribed, in part, the regular increase of the consumption, during the last century; to the second, the more inconsiderable, but scarcely less regular, increase of apoplexy, palsy, gout, and sudden deaths; and to the last, the more frequent occurrence of insanity in its different forms: and the increase of intemperance and vice, in a large and populous city, doubtless contributes much to the augmentation of all these diseases.

Dr. Heberden states the proportion of these three classes of disease, at the beginning, middle, and end, of the eighteenth century, to have been as follows:

| | Beginning. | Middle. | End. |
|-----------------------|------------|---------|-------|
| Consumption, | 3,000 | 4,000 | 5,000 |
| Palsy, apoplexy, etc. | 157 | 280 | 300 |
| Lunatic, | 27 | 75 | 70 |

If we compare the mortality from consumption, at those three periods, with the total mortality, we find, that in 1669 the deaths, from consumption, were, to the whole, as,

| | 1 | to about | 6 | 2 |
|----------|---|----------|---|---|
| In 1749, | 1 | | 5 | 5 |
| 1799, | 1 | | 3 | 8 |
| 1808, | 1 | | 3 | 6 |

The reports of consumption, in other parts of Great Britain, correspond, in a great degree, with the accounts of its prevalence in London, and, therefore, render this ascription of its causes and origin unsatisfactory.

Dr. Lettsom, however, in a letter to dr. Hosack, on the diseases of London, (*Amer. Med. and Phil. Reg. vol. 2*) says, "Whilst the phthisis pulmonalis is rapidly increasing in America, and in the european continent, it is *diminishing* here. The croup is less fatal, in consequence of the immediate and free use of the lancet, and of leeches, with purgatives, than heretofore; nor is angina scarlatina either so frequent or so fatal. The typhus is almost extinct, and the cholera morbus is unfrequent; and, as far as my experience extends, the syphilis is milder, or easier cured; and, lately, such has been the prolongation of health and life as to lessen the premiums of insurance considerably."

Out of 19,954 deaths, in London, in 1808, 5,220 are ascribed to the consumption. The christenings, in that year were 19,906, nearly equal to the burials.

In 1809, the healthiest year which London ever enjoyed, there were 16,680 deaths, 4,570 of which were produced by the consumption; the number of christenings was 19,612, making the excess of births above the deaths nearly 3,000. (See the London Annual Medical Review and Register, for 1808 and 1809.)

Dr. James E. Smith says, that "In Italy, consumptions are found to be very contagious, though less evidently so in England." It is intimated, if my memory serves me, in that excellent work, the Emporium, that the general use of cotton shirts, etc. may have a pernicious influence in producing this disease. Its increased fatality in Europe, as well as in America, is, probably, owing to a complication of causes; and, indeed, the periodical prevalence and disappearance of certain diseases, must be classed among those arcana which providence has concealed from man.

Salubrious as the climate of Madeira is generally reckoned, we find, that even there pulmonary diseases cut off a great number of the inhabitants. Of the various districts of North America, New-York has been considered, by many, as being especially favoured with regard to the mildness of its seasons; and the changes of its weather were referred chiefly to the difference in the prevailing winds. Among a series of interesting remarks on the climate and diseases of New-York, made by Lieutenant-governor Colden, about seventy years ago, and inserted in the American Medical and Philosophical Register, vol. 1. this made

cal philosopher observes, "The air of the country being almost always clear, and its spring strong, we have few consumptions, or diseases of the lungs."

"People inclined to be consumptive in England, are often perfectly cured by our fine air; but if there be ulcers formed they die. The climate grows every day better, as the country is cleared of the woods; and more healthy, as all the people that have lived long here testify. This has even been sensible to me, though I have been but about twelve years in this country; *I, therefore, doubt not but it will, in time, become one of the most agreeable and healthy climates on the face of the earth.* As it is at present, I prefer it to the climates of England, and, I believe, most people that have lived any considerable time here, and have returned to England, will confirm this."

If the climate of New-York was formerly thus mild and healthy, and a constant amelioration in its temperature is consequent upon our numerous settlements and improvements, as has been maintained by many distinguished writers, to what shall we ascribe the extraordinary mortality occasioned by pulmonary consumption at the present day? none will deny this disorder to be influenced by climate, and independent of effects arising from particular employments, and modes of living; but we will, perhaps, find the most satisfactory answer to this question, in considering phthisis in its various forms as the offspring rather of increased dissipation, of great imprudence in dress, and of consequent exposure to sudden changes of temperature, than of any peculiarity in our climate and seasons.

This opinion of the origin of this disease is further confirmed, upon reflecting upon its nature. Consumption is reckoned, by a practical observer, dr. Hosack, who has devoted a large share of attention to this subject, (*Quarterly Reports on the Diseases of New-York,*) as being in a great majority of instances in its primary or forming stage, an inflammatory complaint, the effects of cold; and as yielding to the treatment indicated for the removal of inflammation, when affecting other parts of the chest.

We have, in many instances, employed blood-letting with the most happy effects, in many cases of incipient *phthisis*, even where strong hereditary predisposition existed. Indeed, we are induced, from some late observations on this subject, to express the opinion, that in the commencement of phthisis, as in peripneumony, blood-letting is not sufficiently employed, but is too frequently neglected until the inflammation has so far extended that suppuration becomes inevitable. Nor do physicians, in general, appear to have been sufficiently attentive in describing the symptoms characteristic of the first or inflammatory stage of phthisis, and, consequently, have been regardless of that active antiphlogistic treatment which alone can prevent the tuberculous or suppurative stage. Inasmuch as suppuration, or a purulent secretion from the lungs necessarily implies

preceding inflammation, we conceive too early attention cannot be given to the premonitory symptoms which announce the inflammatory stage, but which are frequently so inconsiderable, being seated in the less sensible, the cellular portion of the lungs, that both physician and patient are alike regardless of the present symptoms, and of the consequences to which they lead. Instead, therefore, of trusting to *sirups, anodynes, pectorals, or ptisans*, to allay the occasional dry hacking cough and pains of the chest, which indicate the first approach of the disease, we earnestly recommend the same active treatment by *blood-letting, blisters*, and other means of diminishing excitement, as are employed in the treatment of a pleurisy, or any other acute inflammation; and we could add, in confirmation of our view of this subject. many recent cases, in which the practice here recommended has been attended with the most happy results." *American Medical and Philosophical Register, vol. 2.*

NOTE 39.

Contagion and infection are subjects which have been fertile of discussion and controversy. Their peculiar character, and the agency which they exert in giving origin to, and modifying the form of, diseases, seem to have attracted, at a very early period, a large share of attention. Among the ancient physicians we find *to be*, in express terms, stating the manner in which plague is communicated; *et quidem quod acris pestilens febrem afferre consuevit, nemo sanæ mentis dubitavit, sicuti et pestilenti morbo laborantium conversatio periculosa, ne inde contagium contrahatur, quemadmodum ex scapie et lippitudine.* (*Galen. de Differ. Febr.*) Livy, the historian, appears to have been duly sensible of the power of contagion; *et primo temporis ac loci vitio, et ægri erant, et moriebantur: postea curatio ipsa et contactus agrorum vulgabat morbos*; and in describing a pestilential disorder which prevailed in the early part of the fourth century, A. U. C., he again remarks, *vulgatique contactu in homines morbi.* (*Lib. iv. cap. xxx.*) Soon after the restoration of learning, when the stock of knowledge preserved by the arábians was increased by new facts and discoveries, and medical science was augmented by the laborious investigations of that prolific age, we find Diemerbroeck and others devoting especial attention to this subject. Though a difference of opinion existed, it is manifest that a large majority of physicians maintained the general doctrines of contagion.

At a more recent period the great mortality which accompanied the different attempts at colonization in the West-India islands, and on the coast of Africa

called the minds of medical observers to the peculiar nature of intra-tropical diseases. The appearance of the *yellow fever* at Boulam, in 1793; its general prevalence in most of the West-India islands; and subsequently, its more extensive diffusion in different parts of the United States, have been the means of enlarging the original limits of the controversy, and have given to the discussion an interest inferior to none among medical inquiries. Pre-eminent among the European authors who have entered upon this discussion, may be considered the celebrated dr. Chisholm and dr. Haygarth, whose respective writings on the malignant yellow fever are monuments of the learning and talents of their authors, and may be pronounced the most able and satisfactory works in support of the doctrines which they have espoused; as the writings of our late distinguished countrymen, doctors Rush and Miller, may be referred to as containing the best summary of the theories which these authors have embraced.

Although the specific nature of the matter by which certain diseases are propagated is still imperfectly understood, yet it were idle to deny the existence of contagion; and it is certain we have recently ascertained, in no inconsiderable degree, the laws by which it is governed. "In the present state of medical knowledge," says the Edinburgh Review, "it would not, we conceive, be at all more absurd to deny the existence of fever altogether, than to maintain that it is not propagated by contagion." *Review of Dr. Haygarth's Letter to Dr. Percival.*

An attempt was made by the late dr. Richard Bayley, of New-York, to establish a distinction between *contagion* and *infection*, and to distinguish the diseases arising from these two different sources. (*Treatise on the Yellow Fever of New-York*, 1795.) This distinction has been adopted by some European physicians, and, among others, by dr. Joseph Adams, but without the due acknowledgment.

About the year 1797, dr. Mitchill promulgated his ingenious doctrines on the pestilential fluids; and in 1804, dr. Edward Miller made public his Attempt to Deduce a Nomenclature of certain Febrile and Pestilential Diseases from the origin and nature of their remote cause. *Medical Repository*, vol. 1 and 7.

In July, 1803, a new theory on the laws governing the communication of contagious and infectious diseases, was published by dr. Hosack, in a letter addressed to dr. Col'm Chisholm. (Vide *Edin. Med. and Surg. Journal*, vol. 5.) Dr. Hosack admits the distinction proposed by dr. Bayley to approach nearer the truth than any other that had hitherto been offered, but he does not consider it as presenting a view of the whole truth. Those diseases which are communicable from one person to another, and are generally considered of a contagious or infectious nature, are distributed by dr. H. into three classes. First, such as are communicated exclusively by *contact*; as itch, siphylis, sibbens, laanda of

Africa, frambæsia, elephantiasis, variola vaccina, and hydrophobia: secondly, such as are communicable by *contact* and the *atmosphere*; as small pox, measles, chicken pox, whooping cough, scarlatina, and cynanche maligna: thirdly, these diseases generally communicable only in an *impure* air; as plague, yellow fever, typhus, in its various forms, and dysentery.

The following extract is taken from the introductory part of dr. Hosack's letter:

"The visitor or attendant contracts disease from one of *two sources*, either from the filth of the sick room, or from a *specific something* issuing from the body of the sick, the consequence of the peculiar disease under which he labours. If a person visiting another ill of the *yellow fever*, or *plague*, derives his disease from the *impure atmosphere* of the apartment, I ask, how it happens, that in all instances he contracts the *same disease* with that of the person whom he visits? why is his disorder not an *intermittent*, a *remittent*, *jail fever*, or *dysentery*, which are considered the usual produce of filth? if he derives any thing *specific* from the sick, his disease is then assuredly not to be considered as occasioned by the *atmosphere*, but depending on the *peculiar condition of the fluids*, or state of the system, induced by the action of a specific poison, in other words, it is to be considered a *contagious* disease. The distinction proposed by dr. Bayley, inasmuch as it does not account for the communication of the *peculiar form* of fever or disease which is thus propagated, I therefore consider to be insufficient to account for the circumstances attending the communication of those diseases to which it is applied. That I may not be misunderstood, I will suppose A to be ill of *dysentery*, a disease well known to be attended with a *peculiar train of symptoms*; he is in a small confined apartment, his person is neglected, the atmosphere round him is rendered impure and offensive; under these circumstances B visits him, and a few days after is also taken sick with the *same disease*, attended in all respects with the *same* dangerous symptoms which characterize the disorders of A. Dr. Bayley and those who adopt the doctrine of *infection* as opposed to *contagion*, consider the disease of B to proceed from the *impurities of the air of the chamber*, and not from any thing *peculiar* emanating or secreted from the body of A. But as we may, *without hazard*, visit an equally filthy chamber where C lies ill of *cholera morbus*, or D with a *broken limb*, I therefore ascribe the disease of B to something more than the *impure air* of the chamber of A. I ascribe it to a *peculiar virus* generated in his system by the disease under which he labours, and communicated by his excretions to the surrounding atmosphere, rendering it thus capable of producing the same disease in those who may be exposed to its influence."

Europe is already greatly indebted to that spirit of investigation which characterizes the professors of the healing art in this country; a spirit which has had

to the overthrow of many errors, and to the discovery of new physiological and pathological principles ; which has prompted its professors to exertions that have eminently contributed to the general adoption of a more judicious treatment of many disorders, to the rejection of numerous inert substances inserted into the *materia medica*, and to the augmentation of the list of those of approved medicinal virtues ; to a more liberal use of vigorous remedies and to a more bold and successful method of practice.

This view of the laws regulating the communication of contagious disorders proposed by dr. Hosack, greatly limits the ground of controversy ; and I am gratified in adding, that it has met with a most favourable reception with the physicians of Europe, and has reflected great honor on the state of medical learning in this country. (See the *London Ann. Med. Review*, for 1809 ; the *Edin. Med. and Surg. Journal*.) For more ~~able~~ details on the subjects of contagion and infection, and for the histories of various epidemics which have prevailed in the United States, the reader will consult that valuable periodical journal, the *Medical Repository*, edited by drs. Mitchill, Smith, and Miller ; the *Philadelphia Medical Museum*, by dr. Coxe ; the *American Medical and Philosophical Register*, conducted by drs. Hosack and Francis ; and the *Massachusetts Medical Communications*.

The following note refers to the account of Bacon and Coke, in the 16th page, and was accidentally omitted.

Having frequently referred to Francis Bacon, (lord Verulam, and viscount at. Albans,) it may not be amiss to mention his melancholy fall. Pope says,

“ If parts allure thee, think how Bacon shined,
The brightest, wisest, meanest of mankind.”

In March, 1620, a committee of the house of commons, appointed to inquire into abuses in the courts of justice, reported specific charges of corruption against him in the execution of his office of lord chancellor of England. His antagonist, sir Edward Coke, who was then a member, was one of the committee appointed to draw up the charges against him ; and he was finally impeached before the house of lords. He at first avoided an investigation on the plea of sickness ; but finally, on the 30th of April, he made a humble and contrite confession, and admitted that, *pendente lite*, he had received large sums of money, and other donations, from suitors in his court, and he was fined forty thousand pounds, impris-

oned in the tower during the king's pleasure, rendered incapable of holding any office, place, or employment, and of sitting in parliament, or coming within the verge of the court. The king afterwards set him at liberty, and gave him a pension. He lived obscurely in his chambers at Gray's Inn, where his lonely and desolate condition so wrought upon his melancholy temper, that he pined away, and, after all his influence, he was reduced to so low an ebb as to be denied beer to quench his thirst; for, having a sickly stomach, and not liking the beer of the house, he sent now and then to lord Brook, who lived in the neighbourhood, for a bottle of his beer, and after some grumbling the butler had orders to deny him.

He died on the 9th of April, 1626, in the sixty-sixth year of his age—a melancholy example of great powers of mind connected with profligacy of heart.

Sir Edward Coke was tainted with the scholastic learning of the times, and was scurrilous and malignant in the extreme. As attorney general he conducted the prosecution for high treason against the illustrious sir Walter Raleigh, in the most barbarous manner. As a specimen of his manner I have made the following extracts:

“Here is mischief, mischief in summo gradu, exorbitant mischief. My speech shall touch these three points—mutation, supplantation, and defence.”

“There is treason in the heart, in the head, in the mouth, in consummation; comparing that in the corde to the root of a tree; in ore to the bud; in manu to the blossom; and that which is in consummatione to the fruit.”

In the course of the trial several altercations took place between him and the prisoner; in one of which he thus addressed Raleigh:

“Thou hast a spanish heart, and thyself art a spider of hell.”

At one time one of the court gently checked him, on which he sat down in a great rage, and would not proceed until after several urgent entreaties. At the repeating of some things Raleigh interrupted him and said he did him wrong, upon which the following curious dialogue took place, in which Raleigh handled him with great, but just, severity.

Attorney. Thou art the most vile and execrable traitor that ever lived.

Raleigh. You speak indiscreetly, barbarously, and uncivilly.

Attorney. I want words sufficient to express thy viperous treason.

Raleigh. I think you want words indeed; for you have spoken one thing half a dozen times.

Attorney. Thou art an odious fellow; thy name is hateful to all the realm of England for thy pride.

Raleigh. It will go near to prove a measuring cast between you and me, *mr. Attorney.*”

Raleigh was condemned, and was imprisoned fourteen years in the tower, where he devoted himself to study and writing. He was afterwards liberated.

and permitted to look for a mine in America, where, having given offence to the king of Spain, he was sacrificed to the resentment of that government, and executed on his old sentence, in 1618. Just before his decapitation, he took the ax from the executioner, and, smiling, thus addressed the sheriff: "this is a sharp medicine, mr. Sheriff, but it is a physician that will cure all diseases." *State Trials*, vol. 1.

The following supplementary note relates to the 21st page.

Butler's satire against the Royal Society commences in the following strain :

" A learn'd society of late,
The glory of a foreign state,
Agreed, upon a summer's night,
To search the moon by her own light,
To take an invent'ry of all
Her real estate and personal ;
And make an actual survey
Of all her lands and how they lay."

The poem then proceeds to state that they pointed a telescope at the moon, and saw two armies engaged in desperate battle ; and finally a huge elephant, which was supposed to have taken fright, and broken loose from one of the hostile armies ; after several strange speculations upon these phenomena, and their preparing a memoir on the spot for insertion in the transactions of the society, a person present, who was not so deeply infected with this philosophical mania, discovered that the elephant was a mouse which had insinuated itself into the instrument. This threw the assembly into confusion, and finally they agreed to "unmount the tube and open it," when lo ! the hostile armies appeared in the shape of

" prodigious swarms
Of flies and gnats, like men in arms."

And the poem then concludes,

" But when they had unscrew'd the glass,
To find out where th' impostor was,
And saw the mouse that by mishap
Had made the telescope a trap,
Amaz'd, confounded, and afflicted,
To be so openly convicted,

Immediately they get them gone,
 With this discovery alone,
 That those who greedily pursue
 Things wonderful, instead of true,
 That in their speculations choose
 To make discoveries strange news,
 And nat'ral history a gazette
 Of tales stupendous and far fet ;
 Hold no truth worthy to be known,
 That is not huge and overgrown,
 And explicate appearances,
 Not as they are, but as they please,
 In vain strive nature to suborn,
 And, for their pains, are paid with scorn."

The famous Cowley, who was one of the earliest members, addressed a complimentary poem to the Royal Society, in the form of a pindaric ode, which Sprat has prefixed to his history, and which appears to have mitigated his sufferings under the attacks of the hostile wits. Cowley, appears to have had the satire of Butler in his eye when he wrote the following lines :

" Mischief and true dishonour fall on those
 Who would to laughter or to scorn expose
 So virtuous and so noble a design,
 So human for its use, for knowledge so divine.
 The things which these proud men despise, and call
 Impertinent, and vain, and small ;
 Those smallest things of nature let me know,
 Rather than all their greatest actions do.
 Whoever would deposed truth advance
 Into the throne usurped from it,
 Must feel at first the blows of ignorance,
 And the sharp points of envious wit.
 So when by various turns of the celestial dance,
 In many thousand years
 A star, so long unknown, appears,
 Though heaven itself more beauteous by it grow,
 It troubles and alarms the world below,
 Does to the wise a star, to fools a meteor, show."

I hope that this specimen of the effusions of two of the most celebrated wits of the age may not be considered as improper.

Dryden was also one of the earliest members of the Royal Society, and was finally excused from paying his arrears probably on account of his straightened circumstances. See *Birkh.*

The Royal Society certainly afforded some ground for the ridicule that was cast upon them. Sprat says, "their manner of gathering and dispersing questions is this: First they require some of their particular fellows to examine all treatises and descriptions of the natural and artificial productions of those countries in which they would be informed. At the same time they employ others to discourse with the seamen, travellers, tradesmen, and merchants, who are likely to give them the best light. Out of this united intelligence from men and books they compose a body of questions concerning the observable things of those places." These questions, so framed, were dispersed to their correspondents in different quarters. Thus far the scheme was judicious, and was in general judiciously executed; but some of the questions were calculated to create mirth at the expense of the society. Sprat has published answers returned by a gentleman of Batavia to certain inquiries sent thither. Two of them are as follows:

"Whether in the island of Sambrero, which lyeth northwards of Sumatra, about eight degrees northern latitude, there be found such a vegetable as master James Lancaster relates to have seen, which grows up to a tree, shrinks down when one offers to pluck it up into the ground, and would quite shrink unless held very hard? and whether the same being forcibly plucked up, hath a worm for its root, diminishing more and more according as the tree groweth in greatness; and as soon as the worm is wholly turned into the tree, rooting in the ground, and so growing great? and whether the same plucked up young, turns, by that time it is dry, into a hard stone, much like to white coral?"

"Answer. I cannot meet with any that ever have heard of such a vegetable.

"What ground there may be for that relation concerning horns taking root and growing about Goa?"

"Answer. Inquiring about this, a friend laught, and told me it was a jeer put upon the portuguese, because the women of Goa are counted much given to techery."



